



**36TH
IAS**

MEETING OF
SEDIMENTOLOGY



**12 - 16 June 2023
CROATIA
DUBROVNIK**

The Croatian Geological Society
and

The International Association of Sedimentologists
invite you to the

36th IAS Meeting of Sedimentology

Dubrovnik, 12–16 June, 2023



Second Circular

Call for Abstracts

www.iasdubrovnik2023.org

Registration and accommodation e-mail: info@iasdubrovnik2023.org

Conference e-mail: iasdubrovnik2023@hgi-cgs.hr



Dear colleagues,

We are pleased to invite you to the 36th International Meeting of Sedimentology (36th IMS) to be held in Dubrovnik, Croatia, **12th–16th of June 2023**. The 36th IMS is supported by the International Association of Sedimentologists. **The city of Dubrovnik**, with its amazing Old Town and Walls of Dubrovnik, is one of the UNESCO World Heritage Sites due to its outstanding medieval architecture and rich history. The city lies on the rocky coast above the crystal-clear waters of the Adriatic Sea, offering an inspirational environment for researchers to share and discuss their ideas. We are most honoured to continue a tradition that started in 1983 with the 4th IAS Regional Meeting held in Split, Croatia, and the 22nd IAS Meeting of Sedimentology held in 2003 in Opatija, Croatia – to meet every 20 years in Croatia.

The online registration and abstract submission are now open. We propose 17 Scientific Themes with 40 Special Sessions (SpS) and 17 General Sessions (GS). There will be ten field excursions held in Croatia, and neighbouring Slovenia, Bosnia and Herzegovina, and Montenegro. Four workshops, as well as activities for early career scientists will be offered. Please look for current information about the conference on the Meeting website.

See you in Dubrovnik!

Your Organizing Committee

Content

Important dates	3
Programme overview	4
General information	5
Registration fees	6
Scientific Themes, Special Sessions (SpS) and General Sessions (GS).....	7
Description of Special Sessions	10
Workshops	22
Field trips.....	26
Activities for Early Career Scientists	38
Venue	39
How to get there.....	40

Important dates

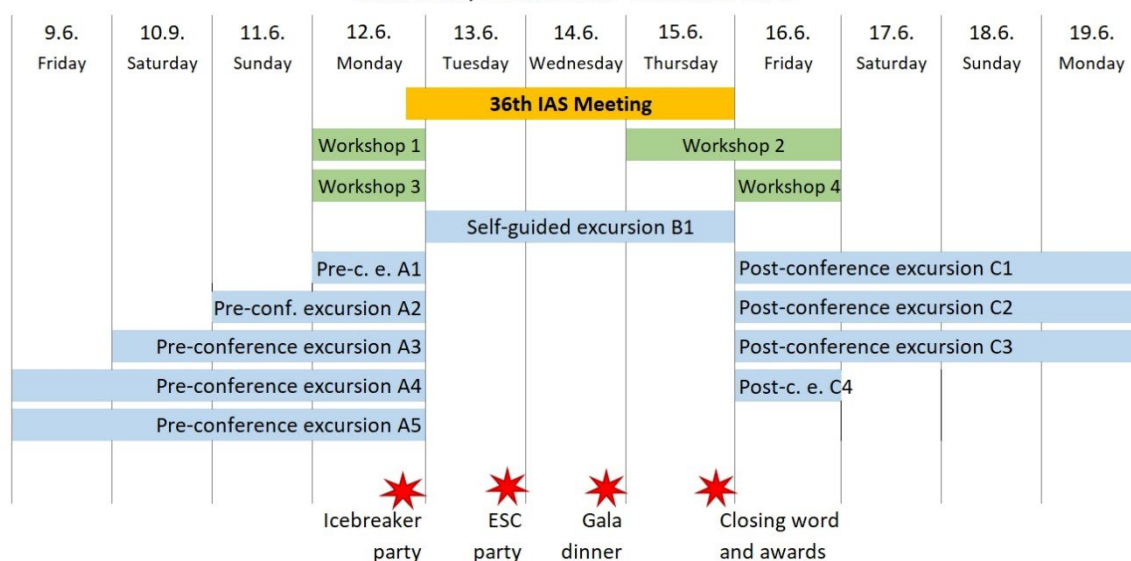
- **October 1, 2022** 1st circular, Call for sessions
- **December 1, 2022** Deadline for session proposals
- **December 1, 2022** Online registration opens
- **December 15, 2022** 2nd circular, Call for abstracts
- **February 15, 2023** Deadline for abstract submission
- **March 15, 2023** Deadline for field trip registration
Notification on acceptance of abstracts
- **April 1, 2023** Deadline for the early registration fee
- **April 15, 2023** Deadline to short course registration and fee
- **May 20, 2023** 3rd circular
Deadline for the regular registration fee
- **June 9–12, 2023** Pre-conference field trips
- **June 12, 2023** Pre-conference workshops
- **June 12, 2023** Icebreaker party
- **June 13–15, 2023** Meeting
- **June 16–19, 2023** Post-conference field trips
- **June 15–16, 2023** Post-conference workshops

Programme overview

The main scientific programme will take place over three days, between the Opening ceremony with the Icebreaker party in the evening of Monday, June 12th and the Closing ceremony in the afternoon on Thursday, June 15th. The 36th IMS will include five pre-conference, one mid-conference and four post-conference excursions. The workshops will be pre-conference and pot-conference.

36th IAS Meeting of Sedimentology

Dubrovnik, Croatia 12th - 16th June 2023



Organizing Committee

Lara Wacha, *chair, Croatian Geological Survey, Zagreb*

Katarina Gobo, *University of Zagreb, Faculty of Science*

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Davor Pavelić, *University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering*

Kristina Pikelj, *University of Zagreb, Faculty of Science*

Igor Vlahović, *University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering*

General information

Language of the Meeting

English will be the official language of all Meeting activities.

Submission of Abstracts

The IAS Dubrovnik Organising Committee invites the submission of abstracts of original work for consideration as an oral or poster presentation. Please use the abstract submission page on our website www.iasdubrovnik2023.org. The **deadline** for abstract submission is **February 15, 2023**.

Please select the preferred scientific theme and session. **Each participant can be presenting author of one oral and one poster presentation or two poster presentations.** All presenting authors must pay the registration fee.

The oral presentation can be moved to poster by the organising committee and session's conveners in the case of a large number of oral presentations and preferred session reaching its full capacity. You can change the presenting author in case of unforeseen circumstances and absence from the conference by addressing via e-mail info@iasdubrovnik2023.org.

Please note that only abstracts of participants who paid the registration fee will be included in the book of abstracts.

Abstract preparation

Please follow the guidelines for abstract preparation. The abstract text is considered final as submitted. Grammar and style as well as clarity of the message are the sole responsibility of the author(s). The abstract should be limited to 2000 characters. The title should not exceed 15 words. Figures and tables are not allowed, references only if necessary. Please use the metric measurements and symbols. The final decision on acceptance or rejection of an abstract will be made by the scientific committee.

Presentation modes

Oral presentation

Each oral presentation can last at most 15 minutes, including the time for questions and discussion.

Poster presentation

For each poster, a dedicated poster board with fixing material will be provided. Each poster board will be numbered. Maximum poster size is limited by the size of the panel, which is 200 cm in height x 100 cm in width. The size of the poster can be smaller than the panel, but must not exceed these maximum dimensions.

Registration fees and payment options

Registration should be made online through the conference website. Please follow the instruction given therein. Participants of field trips and short courses must also be registered for the Meeting.

Registration fees (EUR)

	Student/Retired IAS member	Student/Retired non-IAS member	Professional IAS member	Professional non-IAS member
EARLY	200	300	400	600
REGULAR	280	350	500	750
ON SITE	340	400	650	1000
ONE DAY	120	140	250	350
Accompanying person	90	90	90	90

Cancellation policy

All cancellations have to be sent by e-mail to petra@spektar-holidays.hr.

Cancellation before March 01, 2023 – full refund deducting handling fee of 30 EUR.

Cancellation from March 01, 2023 to April 01, 2023 – refund of 50% deducting handling fee of 30 EUR.

Cancellation after April 01, 2023 – no refund.

Visa and Letter of Invitation

We will provide a personal Letter of Invitation for the purposes of obtaining a visa to attend the IAS Meeting in Dubrovnik. The Letter of Invitation can be issued only to those who have completed the registration and paid the registration fee.

Covid-19 travel policy

Although the Covid-19 pandemic is abating, please check the travel policy and other rules before the Meeting. We will also follow the Covid-19 situation and update the information on the Meeting website if needed.

Scientific Themes Special Sessions (SpS) and General Sessions (GS)

Theme 1. Continental carbonates, karst and cave deposits

- 1.1. SpS 1: The response of continental carbonates to (paleo)environmental perturbations: New insights from emergent and old/refined indicators (Convenors: Daniel A. Petrash, Ivica Pavičić and Andrea Martín Pérez)
- 1.2. SpS 2: Cave sediments – archives of past environmental changes (Convenors: Nadja Zupan Hajna, Petra Bajo, Maša Surić, Tomislav Kurečić and Astrid Švara)
- 1.3. SpS 3: Continental carbonates, karst and cave deposits

Theme 2. Shallow-marine carbonate depositional systems and carbonate platforms

- 2.1. SpS 1: Biogeodynamics of Mesozoic marine carbonate depositional systems (Convenors: Thomas Steuber and Mariano Parente)
- 2.2. GS: Shallow-marine carbonate depositional systems and carbonate platforms

Theme 3. Deep-marine carbonate depositional systems

- 3.1. GS: Deep-marine carbonate depositional systems

Theme 4. General topics in carbonate sedimentology

- 4.1. SpS 1: Special Session in celebration of Maurice Tucker's contribution to carbonate sedimentology: Studies of carbonate rocks and sediments – from sequence stratigraphy and cycles to dolomites and microbialites (Convenors: Juan Carlos Laya, Paul V. Wright, Mirosław Slowakiewicz, Edoardo Perri and Trevor Burchette)
- 4.2. SpS 2: Early diagenesis in carbonate sediments (Convenors: Theresa Nohl, Chelsea Pederson, Mohammed Hashim, Juan Carlos Laya and Paul Wright)
- 4.3. SpS 3: Non-marine and marine carbonate factories and their expressions in sequence stratigraphy (Convenors: John Reijmer and Peter Burgess)
- 4.4. SpS 4: Resedimented carbonates – generation, transport, deposition (Convenors: Arnoud Sliotman, Katarina Gobo, Krešimir Petrinjak, Rosine Riera and John Reijmer)
- 4.5. SpS 5: Modern advancements in the characterization of dolomite (Convenors: Cole McCormick and Cathy Hollis)
- 4.6. SpS 6: Carbonate sedimentary systems and their petrophysical expression (Convenors: Anneleen Foubert, Eva de Boever and John Reijmer)
- 4.7. GS: General topics in carbonate sedimentology

Theme 5. Continental clastic depositional systems

- 5.1. SpS 1: Lake sediments as archives of natural and anthropogenic changes in climate and the environment (Convenors: Marta Marchegiano and Patricia Roeser)
- 5.2. SpS 2: New advances in lacustrine sedimentology (Convenors: Shuxin Pan, Carlos Zavala, Mathieu Schuster, Guodong Wang and Lisha Yang)
- 5.3. GS: Continental clastic depositional systems

Theme 6. Shallow-marine clastic depositional systems

- 6.1. SpS 1: Coastal depositional systems: understanding past and modern systems for a resilient future (Convenors: Valentina M. Rossi, Cornel Olariu, Ron J. Steel and Allard W. Martinus)

6.2. SpS 2: Mixed process expressions, and controls on sedimentation in tidal systems (Convenors: Shahin E. Dashtgard, Robert W. Dalrymple and Sergio G. Longhitano)

6.3. SpS 3: Coastal boulder deposits (CBD) as archives of extreme wave events (Convenors: Stefano Furlani, Giovanni Scicchitano and Tvrtko Korbar)

6.4. SpS 4: The sedimentology of coastal storms past & present: informing preparedness for climate change (Convenors: Michael Savarese and Bosiljka Glumac)

6.5. SpS 5: Spatial and temporal variability in coastal to shelf environments (Convenors: Sonia Campos-Soto, Marta Cosma, Marcello Gugliotta, Romain Vaucher, Anna van Yperen and Valentin Zuchuat)

6.6. GS: Shallow-marine clastic depositional systems

Theme 7. Deep-marine clastic depositional systems

7.1. GS: Deep-marine clastic depositional systems

Theme 8. General topics in clastic sedimentology

8.1. SpS 1: Subaqueous sediment gravity flow processes and products (Convenors: Joanna Pszonka, Xin Shan, Arif Hussain and Katarina Gobo)

8.2. SpS 1: Analogues and experiments for understanding early diagenesis of clastic sediments (Convenors: Stuart Jones, Richard Worden, Dimitrios Charlaftis and Sanem Acikalin)

8.3. GS: General topics in clastic sedimentology

Theme 9. Volcaniclastic deposits

9.1. SpS 1: Volcanism and sedimentology (Convenor: Pujun Wang)

9.2. SpS 2: Impacts of volcanism on sedimentary systems (Convenors: Andrea Di Capua, Federica Barilaro, Rosanna De Rosa and Gabor Kereszturi)

9.3. GS: Volcaniclastic deposits

Theme 10. Evaporites

10.1. SpS 1: Evaporitic sedimentary environments, processes and products, with emphasis on the Messinian Salinity Crisis (Convenors: Francesco de la Pierre and Luis Gibert)

10.2. GS: Evaporites

Theme 11. Biochemical and biological processes in sedimentary rocks

11.1. SpS 1: Carbonate biomineralization processes, biominerals, environmental mineralogy/geochemistry (Convenors: Mirosław Slowakiewicz, Edoardo Perri, Mónica Sánchez Román and Daniel Ariztegui)

11.2. SpS 2: Trace fossils in sedimentological analysis: Expanding their applicability in space and deep time (Convenors: Anthony P. Shillito and Maximiliano Paz)

11.3. GS: Biochemical and biological processes in sedimentary rocks

Theme 12. Stratigraphic markers and archives

12.1. SpS 1: Understanding major paleoenvironmental and paleontological crises during the Mesozoic by exploring shallow water carbonates geological archives (Convenors: Gianluca Frijia, Brahimsamba Bomou and Alexis Godet)

12.2. SpS 2: The sedimentary role of calcareous green algae, from Paleozoic to modern (Convenors: Mardi McNeil, Juan Carlos Braga and Jody Webster)

12.3. SpS 3: The stratigraphic record of paleoenvironmental variation in epeiric basins (Convenors: Miquel Poyatos-Moré, Orsolya Sztanó, Ernesto Schwarz, Chelsea Pederson and Mariano Ramirez)

12.4. SpS 4: Tephra and cryptotephra layer detection and identification through multi-proxy data integration (Convenors: Christian Laag, Yohan Guyodo, Stoil Chapkanski and France Lagroix)

12.5. SpS 5: Paleoclimate and paleoenvironmental changes in shallow-marine seas (Convenors: Romain Vaucher, Amy I. Hsieh, Barbora Krizova, Christian Zeeden and Shahin E. Dashtgard)

12.6. SpS 6: Paleosols as valuable records of terrestrial climate and environments (Convenors: Goran Durn, Andrea Mindszenty and Franz Ottner)

12.7. GS: Stratigraphic markers and archives

Theme 13. Provenance of sediments – from source to sink

13.1. SpS 1: Plastic particles as anthropogenic grains in the current and future stratigraphic record (Convenors: Sarah Gabbot and Patricia Corcoran)

13.2. SpS 2: Controlling factors of sediment generation in source to sink studies (Convenors: Guido Pastore and Muhammad Usman)

13.3. SpS 3: Quantitative study for source-to-sink system (Convenors: Guodong Wang, Yongqiang Qu, Duonian Xu and Lisha Yang)

13.4. SpS 4: From river catchments to the deep sea: case studies, applications, state of the art and new frontiers of source-to-sink research (Convenors: Alessandro Amorosi, Michael D. Blum, Piret Plink-Björklund, Luigi Bruno, Bruno Campo and Claudio Pellegrini)

13.5. GS: Provenance of sediments – from source to sink

Theme 14. Tectonics and sedimentation

14.1. SpS 1: Intramountain basins – recorders of tectonics, climate, and biota interactions (Convenors: Nevena Andrić-Tomašević, Oleg Mandić and Marijan Kovačić)

14.2. GS: Tectonics and sedimentation

Theme 15. Sedimentology and hydrocarbons

15.1. SpS 1: Seismo-sedimentological characterization of 3D seismic data (Convenors: Alan Vranjković and Camille Cosson)

15.2. GS: Sedimentology and hydrocarbons

Theme 16. Techniques and technologies in sedimentology

16.1. SpS 1: Beyond dating: frontiers of luminescence as a sedimentological proxy (Convenors: Gloria I. López and Sebastien Huot)

16.2. GS: Techniques and technologies in sedimentology

Theme 17. Open topics in sedimentology

17.1. SpS 1: Open Science: data, software, knowledge, and education (Convenors: Anne Bernhardt, Alisa Martek, Aurélia Privat, Romain Vaucher and Valentin Zuchuat)

17.2. SpS 2: Sedimentary geology education: reaching out to Generation Z and beyond (Convenors: TBA)

17.3. SpS 3: Sedimentology and geotourism (Convenors: TBA)

17.4. SpS 4: Sedimentology and archaeology (Convenors: TBA)

17.5. GS: Open topics in sedimentology

Description of Special Sessions

1.1. Special Session: The response of continental carbonates to (paleo)environmental perturbations: New insights from emergent and old/refined indicators

Convenors: Daniel A. Petrash (Czech Geological Survey, Prague, Czechia), Ivica Pavičić (Faculty of Mining, Geology and Petroleum Engineering, University of Zagreb, Croatia) and Andrea Martín Pérez (Institute of Palaeontology ZRC SAZU, Ljubljana, Slovenia)

Continental carbonates form in a wide variety of depositional and early diagenetic settings, from rivers, lakes and springs, to soils, caves and glaciers. Therefore, they can display a diversity of geometries, mineralogies and fabrics. Due to their sensitivity to climate forcing, these deposits are potential records of information valuable to decode the triggers and effects of global (paleo)environmental perturbations in land ecosystems. The information includes diverse physical and chemical proxies that can also be sensitive to basin-scale forced oscillations. To understand how these proxies are incorporated, altered or preserved in continental carbonates, an increasing number of studies have directed attention to unravel precise carbonate nucleation and crystal growth mechanisms. Some of these studies confer relevance to syngenetic biological controls, while others ascribe a key role to abiotic variables within of the sedimentary and/or diagenetic system. This session aims to bring together current research on the formation of continental carbonates to understand how tectonics, hydrology, climate and ecosystems interact to produce a wide array of deposits with contrasting physical features and discrete chemical and/or isotopic signatures with significance to paleoenvironmental reconstructions. We welcome contributions investigating the sedimentology, geochemistry and geobiology of continental carbonates, both in the rock record and in modern settings. We also look forward to receiving research seeking for a better understanding of their early stages of formation, or dealing with novel observations made in natural environments, or in the lab—in the form of experimental (synthetic) growth and carbonate mineral alteration efforts.

1.2. Special Session: Cave sediments – archives of past environmental changes

Convenors: Nadja Zupan Hajna (ZRC SAZU Karst Research Institute, Postojna, Slovenia), Petra Bajo (Croatian Geological Survey, Zagreb, Croatia), Maša Surić (Department of Geography, University of Zadar, Zadar, Croatia), Tomislav Kurečić (Croatian Geological Survey, Zagreb, Croatia), and Astrid Švara (ZRC SAZU Karst Research Institute, Postojna, Slovenia)

Karst caves play an increasing role in studies of past environmental changes on various temporal and spatial scales. This is primarily due to the wealth of information stored in clastic sediments as well as speleothems found inside most of the caves. Both of these natural archives capture information about the conditions that prevail inside the cave and/or at the karst surface at the time of their deposition. Clastic cave deposits are typically derived from various processes. They contain critical information about the early phases of speleogenesis, climate, and regional palaeohydrology that may not be available in other archives. However, the vast majority of speleothems provide information about the latest speleogenetic phase, as they typically grow under vadose conditions. Due to their amenability for radiometric dating speleothems are nowadays considered as one of the most powerful archives in studies of past climate and environmental changes.

This session welcomes presentations on all aspects of research of cave sediments, i.e. their stratigraphy, depositional processes, provenance, mineralogy, geochemistry, dating techniques, palaeoclimate, and palaeoenvironmental interpretations as well as studies of modern depositional conditions. We especially welcome presentations in which research of clastic cave sediments and speleothem records is combined in order to explore the full potential of both archives. Presentations of the results based on field and laboratory observations, as well as innovative experimental work are all welcomed.

2.1. Special Session: Biogeodynamics of Mesozoic marine carbonate depositional systems

Convenors: Thomas Steuber (Department of Earth Sciences, Khalifa University, Abu Dhabi, UAE) and Mariano Parente (Dipartimento di Scienze della Terra, dell'Ambiente e delle Risorse, Università di Napoli Federico II, Napoli, Italy)

The Mesozoic evolution of marine carbonate depositional systems was linked with the biological evolution of benthic and planktonic carbonate producers. During the Mesozoic greenhouse world, multiple innovations and crises in biocalcification occurred. These are typically evaluated in the context of environmental change such as, e.g., oceanic anoxic events, perturbations of the ocean's carbonate system, or rapid climate change. We invite

contributions that address the biogeodynamics of Mesozoic carbonate depositional systems, preferably with a multidisciplinary approach.

4.1. Special Session: Special Session in celebration of Maurice Tucker's contribution to carbonate sedimentology: Studies of carbonate rocks and sediments – from sequence stratigraphy and cycles to dolomites and microbialites

Convenors: Juan Carlos Laya (Department of Geology and Geophysics, Texas A&M University), Paul V. Wright, Mirosław (Mirek) Slowakiewicz (University of Warsaw, Faculty of Geology), Edoardo Perri and Trevor Burchette

Studies in carbonate rocks and sediments have progressed at a remarkable pace in the last few decades and Maurice Tucker has been a key figure in many of those developments, ranging from the sequence to the nano-scale. As he has described his career “I study any Rock that fizzes”. Maurice has not only been significant in developing new ideas but has also been a pivotal figure in disseminating the scientific progress through his many books, and is internationally recognized as an influential figure in advancing carbonate sedimentology. This session aims to celebrate his career with a combination of talks reviewing new advances in carbonate sedimentology including and not limited to carbonate sequence stratigraphy and cyclostratigraphy and diagenesis.

4.2. Special Session: Early diagenesis in carbonate sediments

Convenors: Theresa Nohl (Westfälische Wilhelms-Universität Münster, Institut für Geologie und Paläontologie), Chelsea Pederson, Mohammed Hashim, Juan Carlos Laya (Department of Geology and Geophysics, Texas A&M University) and Paul Wright

Carbonate sediments are our unique window into past ecosystem evolution, palaeoenvironmental changes and palaeoclimate. They form in a wide variety of depositional settings, involving numerous biological, chemical and physical processes. Post-depositional processes can subsequently alter the sediment's original characteristics. On one hand these processes complicate the reconstruction of original environmental and ecological information, especially at the early stages, and on the other hand they provide important insights into a range of biological, geochemical and physical interactions in the subsurface. Different diagenetic processes and products in marine environments have been studied extensively over the last decades. However, recent work has demonstrated that many of these processes are still poorly understood and controversial, especially those that occur during early marine diagenesis. Moreover, we now appreciate, but are yet to fully understand, how critically important mineral transformations are in marine fluids even during very shallow burial. This session invites contributions that focus on the sedimentological, geochemical, and geobiological processes associated with carbonate diagenesis in general, with a particular emphasis on processes that occur during early diagenesis.

4.3. Special Session: Non-marine and marine carbonate factories and their expressions in sequence stratigraphy

Convenors: John Reijmer (Amsterdam/Fribourg) and Peter Burgess (Liverpool)

The carbonate factory concept, including how such factories respond to relative sea-level oscillations, climate overturns and environmental changes, is still the fundamental basis for understanding most carbonate depositional systems. However, drone-assisted quantitative outcrop studies and experimental numerical forward modelling play an increasingly important role helping unravel the interplay of these controlling factors as they are expressed in the sequence stratigraphy of non-marine to marine, carbonate-dominated depositional systems. In this session we invite authors to submit contributions highlighting novel approaches in this research field. Studies applying various carbonate factory concepts in quantitative outcrop and forward modelling approaches, as well as seismic data applications are welcomed.

4.4. Special Session: Resedimented carbonates – generation, transport, deposition

Convenors: Arnoud Slootman (Department of Geology and Geological Engineering, Colorado School of Mines, Golden, Colorado, USA), Katarina Gobo (Department of Geology, Faculty of Science, University of Zagreb, Croatia), Krešimir Petrinjak (Croatian Geological Survey, Department of Geology, Zagreb, Croatia), Rosine Riera (Norwegian Geotechnical Institute, Perth, Australia), and John Reijmer (Faculty of Science, Department of Earth Sciences, Vrije Universiteit Amsterdam, The Netherlands).
Department of Geosciences, University of Fribourg, Switzerland)

Carbonate environments yield a diverse range of depositional products. Carbonate sediments in marine, lacustrine and terrestrial systems are subject to a multitude of transport and depositional processes. The nature of sediment in carbonate-dominated environments relies on the carbonate factory involved, but also on the temporal and spatial setting, as well as the climate and environmental locale. These factors combine into variations in the amount, grain-size spectrum and mineralogy of the carbonate sediments. Other parameters that impact sediment redistribution in carbonate-dominated settings include platform and slope morphology, and oceanic setting and currents.

Carbonate particles itself comprise a wide range of sizes and shapes governed less by sediment maturity and more by the skeletal nature of the carbonate-producing organisms combined with non-skeletal sediment production. The divergence of shape and density between carbonate and siliciclastic particles leads to marked differences in hydraulic behaviour. However, there are many examples of resedimented carbonate and siliciclastic grains occurring together.

This session aims to explore depositional models for pure and mixed resedimented carbonates – from modern to ancient and from the scale of single grains to shelf-to-basin profiles. We welcome researchers from all disciplines, in particular early career scientists.

4.5. Special Session: Modern advancements in the characterization of dolomite

Convenors: Cole McCormick and Cathy Hollis (University of Manchester)

Our understanding of dolomitization, cementation, and recrystallization in carbonate sedimentary rocks has progressed considerably over the past decade, namely due to modern advancements in the techniques used for field, petrographical, and geochemical analyses (e.g., clumped isotope thermometry, rare earth element analyses, U-Pb geochronology, noble gas isotope analysis). There have also been significant advances in the use of geochemical proxies (e.g. $d^{53}\text{Cr}$, $d^{56}\text{Fe}$, $d^{11}\text{B}$ and halogen concentrations) for interpretation of palaeoclimate, seawater chemistry and oxygenation, although the extent to which these are retained after dolomitization is still unclear. We invite abstracts that address the geological significance of novel analytical techniques, particularly those that illuminate fundamental processes in the formation of dolomite and/or the significance of these processes to paleoceanography or tectonics.

4.6. Special Session: Carbonate sedimentary systems and their petrophysical expression

Convenors: Anneleen Foubert (Fribourg), Eva de Boever (Utrecht/Groningen) and John Reijmer (Amsterdam/Fribourg)

In this session we solicit contributions discussing the petrophysical properties of mixed, non-marine and marine carbonate systems. The evaluation of porosity (pore shape, pore size, pore networks) and permeability distributions as well as acoustic velocity expressions of mixed, non-marine and marine carbonate depositional systems are important in the exploration and exploitation of alternative geo-energy solutions, such as geothermal and geological storage applications (e.g., carbon capture and storage).

Outcrop-related studies and core studies, but also modelling studies and experimental studies are welcomed. Studies based on 3D correlative microscopy (e.g., FIB-SEM, CT-scanning) and upscaling, from sedimentary facies to outcrop-scale, would also fit in this session.

The understanding of carbonate sedimentary systems and their petrophysical behaviour, taking a process-based and quantitative approach across different scales, is crucial in the acceleration of the global energy transition towards a carbon-neutral and sustainable society.

5.1. Special Session: Lake sediments as archives of natural and anthropogenic changes in climate and the environment

Convenors: Marta Marchegiano (Chemistry Department, Vrije Universiteit Brussel, AMG-VUB research unit, Belgium) and Patricia Roeser (Environmental Geology Group Institute for Geosciences, University of Bonn, Germany)

Lake sediments offer valuable high-resolution archives allowing unique reconstructions of climate- and human-induced environmental changes at various time scales. The accurate interpretation of lacustrine records requires an in-depth understanding of both modern and past sedimentation processes. Combining these data with those of multi-proxy investigations can allow to understand the impact of global climate change on specific area as well as to disentangling climate from anthropic triggers. This session welcomes studies from the broad fields of modern and paleo limnology. We encourage presentations dealing with a variety of approaches (e.g. geochemical, sedimentological and biological) that allow to reconstruct past climate and environment, including

state of the art methodology. Paleoclimate and paleoenvironmental reconstructions based on well-dated sedimentary archives applying methods such as inorganic and organic geochemistry, sedimentary DNA, biological remains as well as numerical models or statistical approaches are also welcomed.

5.2. Special Session: New advances in lacustrine sedimentology

Convenors: Shuxin Pan (Research institute of petroleum exploration & development-Northwest (NWGI), PetroChina, Lanzhou, China), Carlos Zavalam (Universidad Nacional del Sur, Buenos Aires, Argentina), Mathieu Schuster (Centre National de la Recherche Scientifique, Strasbourg, France), Guodong Wang (Research institute of petroleum exploration & development-Northwest (NWGI), PetroChina, Lanzhou, China) and Lisha Yang (Research institute of petroleum exploration & development-Northwest (NWGI), PetroChina, Lanzhou, China)

Lacustrine basins are important oil & gas-productive areas of the world. In recent years, lacustrine sedimentology has made great achievement in term of source-sink system analysis, shallow-water delta, beach bar, deep-water sediments, fine-grained deposits, lacustrine carbonate, events deposits, deep reservoir forming mechanism and seismic sedimentology. Even so, challenges of the lacustrine sedimentology are widely existed and needed to carry out innovation. The main idea of this theme is innovation and new exploration fields of lacustrine deposits.

6.1. Special Session: Coastal depositional systems: understanding past and modern systems for a resilient future

Convenors: Valentina M. Rossi (National Research Council of Italy, Institute of Geosciences and Earth Resources, Pavia, Italy), Cornel Olariu (Jackson School of Geosciences, University of Texas at Austin, Austin, Texas, U.S.A), Ron J. Steel (Jackson School of Geosciences, University of Texas at Austin, Austin, Texas, U.S.A), and Allard W. Martinius (Delft University of Technology, Delft, The Netherlands and Equinor ASA, Trondheim, Norway)

Coastal areas are very economically and ecologically valuable environments, and some are very densely populated. However, nowadays these areas are extremely vulnerable and under the threat of global changes. Deposits of coastal environments constitute reservoirs for fresh water resources, hydrocarbons, geothermal energy, and can provide storage for CO₂. Furthermore, these deposits are excellent archives that allow us to understand the evolution of coastal depositional systems under varying sea level, coastal processes and sediment supply.

In this session, we invite contributions on modern, ancient, experimental and numerical modeling studies of coastal depositional systems to improve our understanding of these systems in the past, present, and their possible evolution in the future to guide their correct management.

6.2. Special Session: Mixed process expressions, and controls on sedimentation in tidal systems

Convenors: Shahin E. Dashtgard (Department of Earth Sciences, Simon Fraser University, Burnaby, Canada), Robert W. Dalrymple and Sergio G. Longhitano

This session focuses on how wave and fluvial processes are expressed in tidal systems, and the allogenic and autogenic forcings that impact sedimentation therein. The intention of this session is to develop a more complete picture of how tidal systems work and how they are expressed in the sedimentary record.

6.3. Special Session: Coastal boulder deposits (CBD) as archives of extreme wave events

Convenors: Stefano Furlani (University of Trieste, Italy), Giovanni Scicchitano (University of Bari, Italy), and Tvrtko Korbar (Croatian Geological Survey, HGI, Croatia)

Extreme wave events along rocky coasts can produce specific geomorphological signature in terms of erosion and deposition. Large coastal boulder deposits (CBD) and solitary boulders are common in the sites exposed to open seas, but can be found also in sheltered areas due to regional strong winds, specific geomorphology of the basin, or appropriate local sea-bottom topography. The boulders can be emplaced well above high tide and may include megaclasts that weight up to hundreds of tonnes. The origin of this type of coastal deposits can be related both, to extreme storm waves and to (mega)tsunamis, depending on the site conditions, such as the regional active tectonic setting or extreme wave exposure.

In this session, studies about coastal morphology and sedimentology of boulder deposit sites, monitoring of boulder movements using on-site observations with new technologies, such as image analysis and IA, modelling of wave impacts on rocky coasts, dating of the boulder deposition, and other approaches, are welcome.

6.4. Special Session: The sedimentology of coastal storms past and present: informing preparedness for climate change

Convenors: Michael Savarese (Department of Marine & Earth Sciences, Florida Gulf Coast University Fort Myers, Florida, USA) and Bosiljka Glumac (Smith College Northampton, USA)

As climate change is anticipated to generate greater storminess as the planet transitions through the 21st century, a better understanding of storm history and the associated sedimentologic processes and products is warranted. With such understanding comes a greater capacity to predict, and therefore manage, the impact of future storms. This session will explore: the proxies used by sedimentologists and stratigraphers to interpret storm history; the geomorphologic response of coastal landscapes; the new technologies employed to advance our knowledge; and the modeling efforts available to predict future outcomes. Lastly, we invite case studies in which geoscientists have effectively worked with managers and decision makers to build capacity in coastal resilience.

6.5. Special Session: Spatial and temporal variability in coastal to shelf environments

Convenors: Sonia Campos-Soto (Complutense University of Madrid), Marta Cosma (National Research Council of Italy), Marcello Gugliotta (University of Bremen), Romain Vaucher (University of Lausanne), Anna van Yperen (University of Oslo), and Valentin Zuchuat (RWTH Aachen)

At any latitude and under any kind of climatic conditions, coastal to shelfal systems are characterized by the interplay of various processes (e.g. riverine, tidal, waves/storms, wind). These processes interact with sediment mixtures and can result in complex morphodynamics, variable sedimentary facies, and stratigraphic architectures. The depositional record of these mixed process interactions is challenging to decipher, especially given changes in depositional systems across various timescales: variations in relative sea level, climate, and/or sediment supply, amongst other factors. In addition, the sedimentary signature and architecture preserved in the record can misrepresent what processes were active at the time of deposition, blurred by the amalgamation of different timescales at which each of the processes occur. Because coastal and shallow-marine areas around the world are subjected to intense and ever-increasing anthropogenic stresses, a better understanding of these depositional systems will benefit their sustainable protection and development by local communities and policy makers. In this session, we invite contributions of studies on coastal to shelfal systems either in the rock record or in modern examples, in any type of climatic and tectonic setting, with data acquired (but not limited to) from fieldwork, remote-sensing, experimental lab work, and numerical modelling. Early Career Scientists are warmly welcome to showcase their work, and we encourage them to apply for oral presentations.

8.1. Special Session: Subaqueous sediment gravity flow processes and products

Convenors: Joanna Pszonka (Mineral and Energy Economy Research Institute, Polish Academy of Sciences, Poland), Xin Shan (First Institute of Oceanography, Ministry of Natural Resources, China), Arif Hussain (College of Petroleum Engineering and Geosciences, King Fahd University of Petroleum and Minerals, Saudi Arabia) and Katarina Gobo (Department of Geology, Faculty of Science, University of Zagreb, Croatia)

Subaqueous sediment gravity flows constitute one of the most significant processes of sediment transfer on Earth. They transport and accumulate large quantities of clastic and carbonate sediments, organic matter, and anthropogenic pollutants (e.g. plastics) in subaqueous environments, including lake, delta, continental shelf, continental slope, submarine fan and basin plain. Their deposits may host large volume of hydrocarbon reserves, but also preserve organic carbon that reduces carbon dioxide in the atmosphere significantly. Subaqueous sediment gravity flows are caused by catastrophic events of variable magnitude such as mass failures, major river floods, storm waves, volcanic eruptions and earthquakes, therefore, they are difficult to predict and monitor directly. The sedimentary records of these flows significantly enhance our understanding of sediment transport processes and emplacement mechanisms, paleoclimate, and tectonics. We invite contributions focusing on depositional processes (shallow to deep-water settings) and products (both ancient to modern sediments) of subaqueous sediment gravity flows. Studies using established methods, as well as ones presenting applications of novel approaches, such as modelling and laboratory work to reconstruct records of past events, their impacts on the environment, and forecast the probability of future events. Early Career Scientists are warmly encouraged to give oral presentations.

8.2. Special Session: Analogues and experiments for understanding early diagenesis of clastic sediments

Convenors: Stuart Jones (Durham University, UK), Richard Worden (University of Liverpool, UK), Dimitrios Charlaftis (Durham University & Badley Ashton & Associates, UK) and Sanem Acikalin (University of Newcastle, UK)

Early clastic diagenesis occurs at or near the surface of sediments (sands and muds) where chemistry of the interstitial waters is controlled mainly by the depositional environment. The initial sediment composition, texture, pore fluid chemistry, microbiology and depositional setting all influence the mechanical and chemical properties of the sediment, which in turn may lead to substantial differences in the nature and magnitude of diagenetic change through time and burial. Understanding the early and on-going processes that change the properties of clastic sediments are of economic and environmental importance, and especially for the energy transition. This session invites contributions focused on multidisciplinary approaches to explore a broad range of geochemical, microbial and mechanical changes using modern sedimentary analogues and use of experimental studies. Early Career Scientists are encouraged to participate, including immature ideas and concepts to promote discussion. Our aim is to provide an in-person live discussion about the-state-of-the-art of diagenetic processes studies and to identify promising paths for new research focused on understanding the importance of early diagenetic processes.

9.1. Special Session: Volcanism and sedimentology

Convenor: Pujun Wang (Jilin University, China)

Volcanism and sedimentology are the twin brothers that reflect deep Earth properties and epigenic processes of the Earth. Their interaction process and results are the key to revealing characteristics of the Earth system. Volcano-sedimentary rock associations occur throughout Earth history. The evolution of the Earth surface system is controlled by the earth's internal operation. Volcanism is one of the important links between the Earth's internal processes and the evolution of the surface system. Volcanogenic sedimentary successions are common types of basin fills at various kinds of tectonic settings throughout Earth history. They provide key spatial and temporal records of the interaction processes between global and/or regional tectonics, volcanism, basement features, and overlying sedimentary covers. We seek contributions on (1) volcanism-sedimentary processes including sedimentology and facies analysis that operate between source and sink; (2) the past caldera tectonic systems buried in sedimentary basins and their impact on the subsequent basin forming, filling, and sequence of sedimentary facies; (3) the volcano-related basement architecture and building process and their impact on the overlying basin formation, filling style, and facies distribution; (4) the Paleoclimatic and paleoenvironmental aspects related to the interaction between volcanism and sedimentology; (5) the geological records and/or methods that can characterize the specific features of the interaction processes between volcanism and sedimentology.

9.2. Special Session: Impacts of volcanism on sedimentary systems

Convenors: Andrea Di Capua, Federica Barilaro, Rosanna De Rosa and Gabor Kereszturi

Volcanism plays a fundamental role in the evolution of sedimentary basins and the control of sedimentary processes. From one side, in fact, it produces and disperses large volumes of pyroclastic particles, which are directly accumulated into depocenters or enter into sediment routing systems before their final rest. From the other side, it drives the upcoming of hydrothermal/thermal fluids that interact with the surrounding environments, favoring a multiple spectrum of processes such as rock weathering, authigenic mineral precipitation and maturation of organic matter.

In order to stimulate a multidisciplinary debate on the impact exerted by volcanoes on sedimentary systems, we invite presentations that include, but are not limited to: 1) field- and/or laboratory-based description and interpretation of volcanoclastic sediments and related processes both in modern and ancient realms; 2) basin-related studies on the impact of volcanism under geo-energy purposes; 3) analyses on sedimentary sequences derived from or modified by the uprising of volcanogenic fluids.

This session is co-sponsored by the Commission on Volcanogenic Sediment of the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI).

10.1. Special Session: Evaporitic sedimentary environments, processes and products, with emphasis on the Messinian Salinity Crisis

Convenors: Francesco de la Pierre (Università degli Studi di Torino, Dipartimento di Scienze della Terra, Italy) and Luis Gibert (Universitat de Barcelona, Dept. Mineralogy, Petrology and Applied Geology, Spain)

Evaporites are chemical sediments formed in saline environments where evaporation generates brines concentrated in different compounds. These evaporitic rocks and associated brines have economic interest since are the source of basic materials used in construction, as gypsum, or strategic elements for the development of our society, as Na, K, Li, B. Because of their particular petrophysical properties evaporites are important in tectonic processes. They form detachment surfaces, diapirs and minibasins, playing a key role in the genesis and sealed structure of hydrocarbon reservoirs. During these energy transition times, thick evaporitic units have been proved useful to produce artificial reservoirs to store gas (hydrogen, methane etc). Finally, evaporites are excellent archive of biological activity, since both extremophile communities (archaea, bacteria) and the organisms that live above the pycnoclines (diatoms, forams etc.) are rapidly trapped in the evaporites and often excellently preserved. All these forms of life supply important information about the sedimentary setting and some of them favor the formation of bio-induced minerals as for example dolomite.

This session is addressed to all researchers working on different aspects of evaporitic sediments from ancient environments to modern analogs, from deep-sea brine pools to shallow continental salars. We welcome to this session studies related to the Messinian Salinity Crisis, when the youngest Salt Giant on Earth was formed in the Mediterranean region.

11.1. Special Session: Carbonate biomineralization processes, biominerals, environmental mineralogy /geochemistry

Convenors: Mirosław Slowakiewicz (University of Warsaw, Faculty of Geology), Edoardo Perri, Mónica Sánchez Román, and Daniel Ariztegui

Prokaryotes (bacteria and archaea) contribute a significant fraction of modern biodiversity in terms of species abundance, total biomass and capacity to thrive in habitats inhospitable to more conspicuous forms of life. As a consequence of their diverse metabolic capabilities, prokaryotes participate in transformations and fluxes of most elements present on Earth and hence are important drivers of geochemical cycles. Throughout their long evolutionary history, some prokaryotes have acquired the capability to precipitate biominerals, a process referred to as biomineralization. Biominerals in recent decades have received growing interest from a large interdisciplinary scientific community. Understanding carbonate (bio)mineralization processes gives a deeper knowledge of natural risk, of changes related to anthropogenic activities, and provides tools for risk assessment. Investigating (bio)minerals allows the development of new technologies for a wide range of problems such as water quality, pollution and cement failure. This session is open to the whole scientific community interested in biominerals, sustainability and related technology development. We especially target the following themes: (1) impact of geobiological, geochemical and physico-chemical processes driving carbonate precipitation, with applications to palaeoenvironments and past climate changes, (2) experimental methods and visualization technologies to understand mineral nucleation, precipitation, alteration, and diagenesis, and (3) their synthetic analogues relevant to the environment, biobased-environmental-technologies such as wetland systems, waste and water treatment, bio-metallurgy, bioremediation, or investigations on biominerals relevant to health.

11.2. Special Session: Trace fossils in sedimentological analysis: Expanding their applicability in space and deep time

Convenors: Anthony P. Shillito and Maximiliano Paz

Trace fossil analysis is a valuable tool to support sedimentological, sequence stratigraphical, geochemical, and palaeoenvironmental interpretations in both modern and ancient sediments. For this reason, an accurate assessment of animal-substrate interactions is fundamental for any facies analysis. Despite the recent explosion of published papers, there are still many environments that have hardly been explored. Also, recent work has emphasized that trace fossil analysis can contribute to evolutionary palaeoecology, providing insights for the understanding of major radiations and extinctions through geologic time. This would be essential to calibrate currently used trace fossil models. In this session, we invite contributions concerning the innovative application of trace fossils analysis to several geological problems (sedimentological, geochemical, palaeoenvironmental, etc.) and the study of trace fossils through Earth's history, both in modern sediments and ancient deposits.

12.1. Special Session: Understanding major paleoenvironmental and paleontological crises during the Mesozoic by exploring shallow water carbonates geological archives

Convenors: Gianluca Frijia (University of Ferrara, Department of Physics and Earth Sciences), Alexis Godet (University of Texas at San Antonio, Department of Earth and Planetary Sciences), and Brahimsamba Bomou (Université de Lausanne, Institut des Sciences de la Terre (ISTE))

Shallow-marine carbonate-producing ecosystems represent unique windows on the geological past of our planet. They constitute excellent archives of the response of neritic biocalifiers to severe perturbations of the geochemical cycles during the Mesozoic. Furthermore, they host a valuable record of carbonate-associated proxies of past ocean conditions due to their sensitivity to environmental parameters such as sea level, water temperature, chemistry and turbidity, nutrient and oxygen levels. During the last forty years, research efforts correlated Oceanic Anoxic Events that affected oceans worldwide and resulted in the deposition of organic-rich series in basins, to major biotic turnovers in carbonate platforms. However more discrete crises affected the carbonate platform during the Mesozoic which still need to be documented in detail.

We invite contributions that combine classic and cutting-edge methods in sedimentology, stratigraphy, geochemistry and associated subfields, to identify paleoenvironmental forcing mechanisms and quantify their impact on the evolution of Mesozoic carbonate platforms. Because shallow-marine carbonates are susceptible to be severely altered after their deposition, we also welcome contributions that will consider the impact of diagenetic alteration on the preservation of geochemical signals.

12.2. Special Session: The sedimentary role of calcareous green algae, from Paleozoic to modern

Convenors: Mardi McNeil (Queensland University of Technology, Brisbane, Australia), Juan Carlos Braga (Department of Stratigraphy and Palaeontology, University of Granada, Spain), and Jody Webster (School of Geosciences, The University of Sydney, Australia)

Calcareous green algae are important carbonate producers in modern low-latitude, shallow-water marine environments. They contribute significant amounts of carbonate either as fine-grained carbonate particles resulting from the decay of their aragonite skeletons or as sand- to pebble-sized skeletal pieces, which can be dispersed in the sediment or concentrate as biostromes and bioherms.

Similar carbonates related to calcareous green algae are known since the Late Paleozoic, when phylloid and other enigmatic algae together with dasycladaleans formed extensive deposits. Dasycladaleans continued to be noteworthy components of carbonate rocks until the Early Cenozoic. Halimedaceans are by far the major carbonate producers among green algae in the modern ocean. Members of the family such as *Udotea* and *Penicillus* are unidentifiable in the fossil record while *Halimeda* beds and bioherms occur sporadically mainly since the Miocene, with an extensive modern example of *Halimeda* bioherms occurring in Australia's Great Barrier Reef.

In the last decades, advances on the knowledge of calcareous green algae ecology, sedimentology and stratigraphy, morphology, biogeochemistry and geological record have improved the general understanding of the sedimentary role of the group. This session provides a forum for researchers on modern and fossil calcareous green algae to come together and share perspectives with the community. We welcome contributions from across the spectrum of spatial and temporal scales and from related sub-disciplines.

12.3. Special Session: The stratigraphic record of paleoenvironmental variation in epeiric basins

Convenors: Miquel Poyatos-Moré (Universitat Autònoma de Barcelona, Spain), Orsolya Sztanó (Eötvös Loránd University, Hungary), Ernesto Schwarz (Universidad Nacional de La Plata-CONICET, Argentina), Chelsea Pederson (University of Southern Mississippi, USA), and Mariano Ramirez (George Mason University, USA)

Epeiric seas are sea-water masses which extend over continental platforms. They have formed through Earth's history in multiple tectonic and climatic settings, with their deposits being relatively well preserved in the rock record. Modern examples include the Persian Gulf, the Marmara and Baltic seas, or the Hudson Bay, and ancient examples include the Western Interior Seaway, the Paratethys Sea, or the Iberian Basin. Epeiric sea basins are prone to periods of partial or total disconnection from larger oceans and thus to global eustasy and marine water composition. This makes them sensitive systems to local tectonics, salinity, oxygenation, and climatic fluctuations, and therefore excellent laboratories to study how changing conditions in receiving basins influence biogenic and sedimentation patterns. In order to gain a holistic understanding of the dynamics in these restricted seas (e.g., regional hydrography, ocean connections, sediment-distribution processes and pathways, sea-floor oxygenation, etc.), integration of multiple proxies is required, including (but not limited to) structural, sedimentary, ichnological, and geochemical studies.

This session invites contributions of studies on sedimentary successions from epeiric or restricted seas, either from the rock record or modern examples, from multiple climate or tectonic settings, and either focused on the sedimentological, ichnological, or geochemical record of such successions, or with a more multidisciplinary approach. Early Career Scientists are particularly encouraged to submit and present their work.

12.4. Special Session: Tephra and cryptotephra layer detection and identification through multi-proxy data integration

Convenors: Christian Laag (Université Paris Cité, Institut de Physique du Globe de Paris, CNRS, Paris, France), Yohan Guyodo (Université Paris Cité, Institut de Physique du Globe de Paris, CNRS, Paris, France), Stoil Chapkanski (University of Paris 1, Panthéon-Sorbonne, Laboratory of Physical Geography (LGP), Paris, France) and France Lagroix (Université Paris Cité, Institut de Physique du Globe de Paris, CNRS, Paris, France)

Studies presenting data of various physical properties (e.g., magnetism, colorimetry, granulometry, mid-infrared-spectrometry and geochemistry) demonstrate the ability to detect and/or identify (crypto)tephra layers preserved in marine and lacustrine sediment archives and also terrestrial one such as loess-paleosol sequences and cave deposits. One can characterize the mineral composition, grain size and degree of alteration, an important factor affecting tephra material in terrestrial environments, by one or several of the above mentioned proxy data types. Integrated multi-proxy data increases the potential of detecting cryptotephra layers and identifying source volcanic eruption.

Tephra layers are important stratigraphic markers and chronological tools. Determining a geochronology in terrestrial loess and paleosol sequences beyond the limit of radiocarbon and luminescence dating is challenging. Tephrochronology can help overcome this challenge despite enhanced glass shard weathering characteristic of terrestrial environments. Recent developments with molecular-based analytical techniques sensitive to both crystallized and amorphous compounds, such as the Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy (ATR-FTIRS), can help characterize weathering remains in tephra material and multivariate statistics of mid-infrared spectra may allow the discrimination between different (crypto)tephra layers.

In this session, we invite studies targeting tephra detection and tephra discrimination in Quaternary paleoenvironmental archives. The use of various analytical methods and the development of new and innovating means to identify tephra material in sedimentary records are welcome.

12.5. Special Session: Paleoclimate and paleoenvironmental changes in shallow-marine seas

Convenors: Romain Vaucher (Institute of Earth Sciences (ISTE), University of Lausanne, Geopolis, Switzerland), Amy I. Hsieh (Department of Earth Sciences, Simon Fraser University, Burnaby, Canada), Barbora Krizova (Department of Physics and Earth Sciences, University of Ferrara, Italy), Christian Zeeden (LIAG—Leibniz Institute for Applied Geophysics, Geozentrum Hannover, Germany) and Shahin E. Dashtgard (Department of Earth Sciences, Simon Fraser University, Burnaby, Canada)

The shallow-marine realm (i.e., beach to shelf) is directly affected by short- and long-term climatic fluctuations and sea level change on glacial-interglacial time scales. Climate fluctuations also drive changes in extreme weather events (e.g., tropical cyclones and floods). Traditionally, shallow-marine sedimentary strata are considered to preserve low-resolution archives of paleoclimate and paleoenvironment records because of their presumed temporal incompleteness. However, shallow-marine strata preserve high-resolution records of climate and environmental changes in sedimentary basins with high sediment accumulation rates. In this session, we invite contributions focused on reconstructing Earth's past climate and environmental conditions using shallow-marine strata as archives. Presentations may include but are not limited to field, borehole, laboratory, and modeling data dealing with clastic, carbonate, and/or mixed systems. We particularly invite early-career scientists to deliver oral presentations.

12.6. Special Session: Paleosols as valuable records of terrestrial climate and environments

Convenors: Goran Durn (University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering, Zagreb, Croatia), Andrea Mindszenty (Eötvös Loránd University, Budapest, Hungary) and Franz Ottner (BOKU – University of Natural Resources and Life Sciences, Vienna, Austria)

The importance of geochemical, mineralogical, and micromorphological (GMM) studies for paleoenvironmental interpretation of paleosols in a variety of sedimentary settings is well recognized and can provide a high-resolution proxy for paleoclimate and landscape dynamics. Past climate changes have had a significant impact on the biogeochemical cycles, mineralogy, and micromorphological characteristics of paleosols. Paleoclimate signals in paleosols may also be complicated by diagenetic overprinting. We therefore welcome presentations

that address GMM aspects in paleosols as indicators of changes in paleoclimate and paleolandscape as well as multidisciplinary studies of paleosols that examine weathering processes/erosion and paleosol formation at regional unconformities. Presentations addressing modern soil analogs of ancient climatic conditions are also welcome.

13.1. Special Session: Plastic particles as anthropogenic grains in the current and future stratigraphic record

Convenors: Sarah Gabbot (University of Leicester) and Patricia Corcoran (The University of Western Ontario)

The compositions and textures, transport and depositional mechanisms, and degradation of plastic grains found in sedimentary environments allow for a clearer understanding of climatic, surficial, and human influences through modern geologic time. Like natural sedimentary grains, plastic debris particles are affected by Earth's surficial processes, although their low density, composition and various shapes can lead to unique behaviours in aquatic and terrestrial settings, such as during atmospheric transport, settling, and resuspension. Plastic grains have been identified in sediment cores, grab samples, and even in consolidated sedimentary deposits, such as those referred to as plastiglomerate and technofossils. In addition, sampling, processing and analyzing sediment containing plastic grains, including microplastics (< 5mm), often follows similar procedures used for natural sedimentary deposits. With this special session, we invite contributions that provide novel and insightful data concerning the behaviour of plastic particles in sedimentary environments, as well as presentations that demonstrate how techniques developed for sedimentary investigations are applied to the study of microplastics pollution. This session will appeal to sedimentologists, environmental scientists, and material scientists, and will bring academics together to network and share best practices in the field of anthropogenic debris research.

13.2. Special Session: Controlling factors of sediment generation in source to sink studies

Convenors: Guido Pastore and Muhammad Usman (Laboratory for Provenance Studies, Department of Earth and Environmental Sciences, University of Milano-Bicocca, Milano, Italy)

Throughout sediment routing systems, a series of chemical, physical and transport-dynamic processes modify the pristine sediment composition. Sediment generation (erosion, transport and accumulation) studies allow for a better understanding of the interplay between external forcing factors, such as climate and tectonics, and internal factors, such as proto-source lithology to better characterize the sedimentary history from source to sink. Recent developments in analytical techniques support the crucial role of modifications during sediment transport and storage on sediment composition. Future studies characterizing sediments should, therefore, explicitly consider possible modifications of sediment composition for a more robust understanding of sedimentary systems. The scope of this session is not only to present sedimentary provenance studies, sustained with robust mineralogical/geochemical/isotopic datasets and valuable statistical and modelling interpretations, but also to emphasize the processes controlling compositional modifications. Conceptual approaches and analytical techniques that aim to link sediment compositions to their respective source rocks need a renewed discussion in the sedimentology community. Aspects that deserve explicit consideration are: isotopic and geochemical provenance proxies, weathering of mineral phases in different climates, physical grain sorting due to density and shape during transport, and selective diagenetic dissolution. These often mask the original sedimentary signal, complicating our understanding of the overall sedimentary system. We encourage contributions on I) single grain analysis for source identification, II) multi-technique provenance analysis, III) physical and chemical alteration studies along transport and during diagenesis, IV) sorting and concentration effects of minerals during transport, V) study of sedimentary basins for Quantitative Provenance Analysis, sediment budget and mass balance of modern and ancient routing systems, IV) advances in investigatory techniques (e.g. refined microscale analysis or renewed statistical and modelling approaches).

13.3. Special Session: Quantitative study for source-to-sink system

Convenors: Guodong Wang, Yongqiang Qu, Duonian Xu and Lisha Yang (Research institute of petroleum exploration & development-Northwest (NWGI), PetroChina, Lanzhou, China)

The study of "source-to-sink" system is now a hot spot in the interdisciplinary research of basin-orogen dynamics sedimentology, geography and geomorphology. Although great success has gained after 20 years' research on source-to-sink system of all aspects, the theories and ideas still need to be deepened and improved in basins with different evolutionary processes and types and different time scales. Quantitative study is the key to the in-depth study of the source-to-sink analysis. Through the observation of the modern lake basins from source to sink, the modern source-to-sink parameter database by using high-resolution remote sensing data can be

established for the physical and numerical simulation to innovate new methods and technologies for multidisciplinary integration of source-to-sink analysis. Finally, the quantitative source-to-sink system mapping can be achieved, and the quantitative source-to-sink system model can be established. Quantitative study for source-to-sink appears to be at the forefront of a new revolution in research and application. It is hoped that this meeting will provide a prelude to this revolution

13.4. Special Session: From river catchments to the deep sea: case studies, applications, state of the art and new frontiers of source-to-sink research

Convenors: Alessandro Amorosi (Biological, Geological and Environmental Department, University of Bologna, Italy), Michael D. Blum (University of Kansas, USA), Piret Plink-Björklund (Colorado School of Mines, USA), Luigi Bruno (Dipartimento di Scienze Chimiche e Geologiche, University of Modena and Reggio Emilia, Italy), Bruno Campo (Biological, Geological and Environmental Department, University of Bologna, Italy), and Claudio Pellegrini (Institute of Marine Sciences, Cnr, Italy)

The linkage between onshore to offshore segments, from river catchments to the deep oceans via coastal plains and shelves, is fundamental to unravel the complexity of Sediment Routing Systems (SRSs). Through basin analysis, landscape evolution and multiscale stratigraphic reconstructions, source-to-sink studies aim to quantify sediment generation, transfer, storage, and redistribution on a variety of timescales. The impact of several factors, including human activities and climate changes, can also be assessed by the study of SRSs.

This session aims to discuss the state of the art in source-to-sink analysis in siliciclastic and mixed siliciclastic-carbonate realms on a variety of time scales (from the ancient geological record to the Anthropocene), with a focus on future developments and their potential applications within the context of past, present, and future climate change. We invite presentations from stratigraphers and sedimentary geologists, experimentalists, and numerical modelers that contribute to the advancement of our understanding of SRSs, both in modern and ancient depositional settings.

We particularly welcome comprehensive and interdisciplinary approaches that point to novel concepts of generic significance that enhance the holistic comprehension of: (i) assessment of sediment provenance through compositional characterization of sediments; (ii) dispersal pathways for organic and inorganic detritus; (iii) calculation of sediment volumes delivered to a basin; (iv) sediment-budget calculations reconstructed through geomorphological analyses; (v) processes and mechanisms of sediment production, routing and accumulation; (vi) evolution of sedimentary basins in response to changes in sediment supply and accommodation; (vii) applications to natural resource exploration and exploitation, landscape management, and the social and/or economic impact of source-to-sink investigations.

14.1. Special Session: Intramountain basins – recorders of tectonics, climate, and biota interactions

Convenors: Nevena Andrić-Tomašević (Institute of Applied Geosciences, Karlsruhe Institute of Technology, Germany), Oleg Mandić (Geological-Paleontological Department, Natural History Museum Vienna, Austria), and Marijan Kovačić (Department of Geology, University of Zagreb, Faculty of Sciences, Croatia)

Intramountain basins are an integral part of the mountain ranges. Therefore, they are important recorders of deformation, erosion, syntectonic deposition, magmatic events, variations in biodiversity, and local and regional climatic evolution. Consequently, their sedimentary succession provides an insight into links, interactions, and feedback between tectonics, climate, and biota.

This session aims to assemble research efforts focusing on the dynamics and evolution of the intermountain basins at various temporal and spatial scales, and the “inversion” of their sedimentary record to reconstruct climatic, tectonic and/or biotic evolution/interaction. We invite contributions from the broad field of earth sciences based on field observations, numerical and experimental work.

15.1. Special Session: Seismo-sedimentological characterization of 3D seismic data

Convenors: Alan Vranjković (INA Exploration, Oil Industry, Croatia) and Camille Cosson (Aspen Technology Inc., USA)

3D prestack and poststack seismic data holds crucial information necessary for unlocking hydrocarbon exploration and development potential, especially in stratigraphic type of HC trapping. Basin depositional environment evolution through 3D seismic attribute analysis can be used to identify lateral and vertical sedimentary facies distribution. Sedimentary analysis from core data through wireline logs is upscaled to 3D seismic data enabling seismo-sedimentological characterization of the subsurface. Extracted 3D seismic data geobodies in seismo-geological interpretation, calibrated with well data gives better understanding of key

petroleum system elements distribution – source rocks, reservoir rocks and seal rocks. Seismo-sedimentological characterization which links core and 3D seismic data will play important role in future exploration of brown field basins. Towards seismo-sedimentary geobody atlas of depositional facies recorded in 3D seismic data, presented session will try to start this project on the wider exploration level.

16.1. Special Session: Beyond dating: frontiers of luminescence as a sedimentological proxy

Convenors: Gloria I. López (Colombian Geological Society, Colombia, & Associate Scientist, Recanati Institute for Maritime Studies – RIMS, University of Haifa, Israel,) and Sebastien Huot (Luminescence Dating & Gamma Spectrometry Laboratories, Illinois State University, Champaign IL, USA,)

Since its invention in 1985, Optically Stimulated Luminescence (OSL) rapidly became a valuable alternative to date sedimentary environments beyond the classical Radiocarbon Dating or heated materials beyond its older counterpart, Thermo-Luminescence (TL) Dating. The abundance of both quartz and feldspar mineral grains not only opened up an array of dating possibilities in terms of sediment, rock, or material types, but also at the grain size level. Its inception as a dating method relies on physico-chemical characteristics intrinsic to quartz and/or feldspar grains and their ability to interact with naturally occurring processes such as ionizing radiation, sunlight, or heat. The efficiency of these two natural chronometers depends on several factors such as the quality and provenance of the mineral grain, the length of exposure to the sedimentary cycle (erosion – transport – deposition), the type of surface processes involved in the cycle, the degree of reworking and geo/bioturbation during burial, and the effectiveness of bleaching during exposure to natural sunlight or heating event... not forgetting, alas, the degree of anthropogenic influence, if any.

Instrument developments, including the Portable OSL Reader (P-OSL), and relatively recent methodological advances at both the measurement and analytical levels have not only helped improve and refine luminescence dating but also enhance the understanding of the luminescence signal transforming its application beyond a simple dating method. Nowadays OSL and TL signal values may be used as sedimentological proxies for a variety of processes namely transport, provenance, degree of sedimentary chaos or turbulence, textural maturity, mineralogy, etc. Moreover, P-OSL signals provide additional valuable insights on sedimentation rates, sedimentary facies, besides the overall picture of the continuity of any stratigraphic sequence or depositional pattern.

This session invites submissions focused on novel applications, methodologies using OSL, TL and/or P-OSL in a variety of environments, sediments or rocks as sedimentological proxies. Submissions on non-traditional viewing and/or analysis of values, novel modelling and statistical approaches aimed at refining sedimentological chronologies, large sets of data or chrono-stratigraphies are also welcome.

17.1. Special Session: Open Science: data, software, knowledge, and education

Convenors: Anne Bernhardt (Freie Universität Berlin, Germany), Alisa Martek (National and University Library in Zagreb, Croatia), Aurélia Privat (University of Leeds, UK), Romain Vaucher (University of Lausanne, Switzerland) and Valentin Zuchuat (RWTH Aachen, Germany)

Open Science in academia implies that everything produced by researchers or teachers should be freely accessible to all. Despite a strong push towards Open Science practice in academia and beyond, many financial barriers and lack of Equity, Diversity and Inclusivity (EDI) in academia persist and contribute to major inequalities in access to global scientific knowledge, data, software, and education.

In the digital era where we evolve professionally, making these resources available around the world is easier than it was in the past, and more and more institutions commit to support Open Science. In addition, the world of publishing is undergoing radical changes. Promoting knowledge and science communication is crucial for our society and is a pivotal tool for decision-making by policymakers and stakeholders, as well as citizens who legitimately must have access to publicly-funded research.

In this session, we invite all types of contributions that promote and develop the Open Access to science for all, including the use of Open Science practices (i.e. Open Data and open-source softwares), sustainable and participative community-driven initiatives supporting EDI, transparency, and openness in research, and fostering the broad dissemination of scientific knowledge related to the Earth System. Early Career Scientists are warmly welcome to showcase their work, and we encourage them to apply for oral presentations.

17.2. Special Session: Sedimentary geology education: reaching out to Generation Z and beyond

17.3. Special Session: Sedimentology and geotourism

17.4. Special Session: Sedimentology and archaeology

Workshops

W1

Date your late Cenozoic succession: Applications of cosmogenic nuclide methods in sedimentology

1 day, Monday afternoon, June 12, 2023

Workshop leader: Prof. Michal Šuljan, PhD

Price: 80 EUR

Department of Geology and Paleontology
Faculty of Natural Sciences
Comenius University in Bratislava
Slovakia

Establishing the geochronology of epicontinental successions remains a difficult task, especially in the absence of ash layers, a scattered depositional record preventing effective application of magnetostratigraphy, and the isolated character of basins, which excludes the use of the standard biostratigraphy of planktonic fossil groups. The relatively new and rapidly advancing dating methods based on cosmogenic nuclides provide a solution in many geological tasks previously considered a conundrum. The specific advantage of the methods is found in their broad range of applicability in the Pliocene and Late Miocene age, in contrast with the routinely used radiocarbon and luminescence dating.

The attendees at the workshop will be able to familiarize themselves with the principles of the dating methods and their applications, sampling strategies, and the processing of samples from the rock right through to measuring isotopic ratios and age calculations as the final output. Special emphasis will be given to limitations of the methods across sedimentary environments. The workshop should serve as a basis for the attendees to design their own dating approach for specific geological problems.

The first part of the workshop will focus on authigenic $^{10}\text{Be}/^9\text{Be}$ dating, which employs meteoric ^{10}Be produced in the atmosphere. The method certainly has great potential in the establishment of depositional ages for clay, the most common type of sediment on Earth, up to an age of 14 Ma. Current advances in our understanding of the method's applicability will be presented – these are mostly taken from the Central and Eastern European Neogene basins. The factors affecting the method in alluvial, shallow lacustrine/marine and offshore settings will also be discussed.

The second part of the workshop will focus on applications of the cosmogenic nuclides produced *in situ*. These can be extracted from quartz (^{10}Be and ^{26}Al) and from carbonates (^{36}Cl). Firstly, the exposure dating of sedimentary bodies, such as river terraces, using a depth profile strategy will be introduced. Apart from a simple depositional scenario, the principles of age calculation in the case of multiple depositional events will be presented. The attendees will also be briefed on burial $^{26}\text{Al}/^{10}\text{Be}$ dating and the pitfalls of its application, for example, in the case of periglacial depositional systems.

W2**Quantitative Provenance Analysis (QPA): open problems, applications, and future perspectives****2 days, Thursday afternoon and Friday morning, June 15–16, 2023****Workshop leader: Dr. Luca Caracciolo****Price: 150 EUR**

Lehrstuhl für Geologie
FAU Erlangen-Nürnberg
Germany

Provenance Analysis is an established discipline in Sedimentary Geology. The proliferation of analytical techniques has increased the resolution to which both actualistic and deep-time geological settings can be reconstructed. Nevertheless, understanding compositional data generated from bulk-rock vs single-grain techniques and how to integrate them into geological models requires deep knowledge of (i) all factors controlling the generation of sediments (tectonics, climate, and lithology), their transfer and deposition (downstream grain-size fining, hydraulic sorting), and diagenesis (dissolution vs authigenesis); (ii) potential analytical biases, and (iii) processing of compositional data and integration of different database using state-of-the-art statistical workflows. Case studies and exercises aim at stressing both the need and importance of coupling provenance analysis with sedimentology, geomorphology, structural geology, and climatology, and how to use compositional data for numerical modelling, making Provenance Analysis 'Quantitative' (QPA). Eventually, we will explore how QPA can contribute to climate change research and applications for the energy transition.

W3 The effective meaning of tidal signature in paralic sediments

1 day, Monday afternoon, June 12, 2023

Workshop leaders: M. Ghinassi¹, M. Gugliota^{2,3}, V. Zuchat⁴, A. van Yperen⁵

Price: 120 EUR

¹ Department of Geoscience, University of Padova, Italy

² Faculty of Geosciences, University of Bremen, Germany

³ MARUM – Center for Marine Environmental Sciences, Germany

⁴ Geological Institute, RWTH-Aachen University, Germany

⁵ Department of Geoscience, University of Oslo, Norway

Coastal landscape transformations and accumulation of related sedimentary successions are triggered by complex feedbacks deriving from the combined action of river flows, winds, waves and tidal currents. Dominance of one or more of these processes, that can change over short spatial and temporal scales, implies its major control on morphodynamic processes and on the amount of sediment flux occurring in specific depositional environments and sub-environments. Understanding the interactions between these processes, how they change both in time and space, and the preservation of these interactions in the stratigraphic record is crucial to properly understand the dynamics of coastal systems. And this increased understanding can help increase the predictive power of geological model developed from the interpretation of preserved strata. Nevertheless, although dominance of a specific forcing on morphodynamic processes implies its control on sediment flux, such a dominance does not necessarily result in a widespread occurrence of sedimentary structures related to such process. Vice versa, the common occurrence of specific sedimentary structures cannot guarantee dominance of related genetic process on the overall sediment flux and geomorphic processes. In addition, many sedimentary structures are not unique or diagnostic of a single process and/or depositional environment. In this workshop we aim at discussing the non-linear and controversial relationship between dominance of processes in paralic systems and their preserved signature by analysing sediment cores from two modern environments located 30 km apart. The cores were recovered from the Venice Lagoon and the Po River, both located in northern Italy. The microtidal Venice Lagoon extends for 550 km² and is the largest brackish waterbody in the Mediterranean. The lagoon does not receive any riverine input, and tidal currents conveyed sediments resuspended from tidal flats during storms into a widespread network of channels. The Po River, the largest Italian river, is 650 km long and has an averaged water discharge of ca 500 m³/sec at its mouth. The river mouth experiences the same tidal excursion as the Venice Lagoon. Sedimentary cores recovered from the distal reach of the Po River and from tidal channels of the Venice Lagoon will be observed and discussed in the frame of this workshop. Since both the cored systems experience the same tides but different fluvial inputs, such a comparison will allow to discuss the preserved signature of tidal processes in the Po River and Venice Lagoon channels, which are dominated by riverine and tidal processes, respectively. These examples will be used to discuss the effective processes in charge for controlling sediment flux and morphodynamic processes, and their under- and/or overinterpretation in the sedimentary record of paralic systems. Comparisons with example from the ancient record and other modern examples will also be discussed and used to integrate observations from cores.

W4 The good, the bad & the ugly of sampling for Luminescence Dating**1 day, Friday, June 16, 2023****Workshop leader: Gloria I. Lopez****Price: 80 EUR**

Colombian Geological Society, Colombia

& Associate Scientist, Recanati Institute for Maritime Studies – RIMS, University of Haifa, Israel

Luminescence dating is a rapidly growing geochronological method with increasingly evolving protocols and signals besides applications, making it an ever more used technique. Sediments and sedimentary environments are without a doubt the most targeted when in need of chronologies in geological and geoarchaeological contexts, yet many times the sampling strategies pursued do not fulfil the minimum requirements needed to obtain an acceptable age, or they are simply not enough to resolve the scientific question posed.

Luminescence dating depends on the ability of quartz and feldspar mineral grains to store energy (trapped charge) when exposed to natural ionising radiation readily available in the environment. The trapped charges may be released by stimulation from two main sources: by heat, causing Thermo-Luminescence (TL), or by light, causing Optically Stimulated Luminescence (OSL). Thus, choosing luminescence as the dating method is highly dependent not only on the type of material available for dating, but also on the depositional environment and all the geological (and even anthropological) processes involved previously (e.g., erosion and transport) as well as its geometry and extension. Understanding the depositional setting and the geological forces around it prior to sampling is key as is the timescale considered and the precision required.

In sedimentological contexts, luminescence measures the last time a quartz and feldspar mineral grain was buried. Hence, everything that happens to those grains in-situ during and after burial will affect its signal, thus affecting the resulting age. When the stimulation is natural, a wildfire (in the case of TL) and the sun (in the case of OSL) are the main contributors to erase (bleach or zero) and reset the luminescence signals. Artificial and anthropic factors may also stimulate and reset both TL and OSL signals, namely in the form of earths, ovens, fire, lights. Hence, the importance of knowing what to date, which material to choose, or what units or layers to either avoid or sample.

This course is aimed at providing sufficient tools and practical training to design suitable and proper sampling strategies for luminescence dating in both archaeological and geological settings, focusing on sediments and sedimentary environments. Limitations as well as advantages of the method will be discussed and past experiences shared. Please do not hesitate to bring your own examples of stratigraphies and samples already collected or future field campaigns.

Field trips

Sedimentary cover of the Adria and surroundings: from aborted rifting in the central Adriatic to the post-collisional deposition in the Dinarides, southern Alps, and the Pannonian basin

The deadline for field trip registration is March 15, 2023. The capacity of field trips is limited so, please register for the desired field trip as soon as possible to secure your place. Field trip registration must be accompanied by registration for the 36th IAS Meeting. Several weeks before the field trip, you will receive information about the field trip organization from the field trip leaders.

Trips with insufficient number of registrations might be cancelled. Some of the field trips include travel in countries other than Croatia (Slovenia, Bosnia and Herzegovina, and Montenegro). The participants should take care of any visa or special passports on time, as well as make necessary arrangements in advance. Please feel free to contact us for assistance.

Pre-conference field trips



A1	A brief insight into the Upper Triassic to Miocene sedimentary succession of the External Dinarides SE of Dubrovnik (southern Croatia)		
1 day	June 12, 2023	Croatia	Starts and ends: Dubrovnik (CRO)
Trip leaders: I. Vlahović, A. Husinec, B. Prtoljan			
Contact: igor.vlahovic@rgn.unizg.hr			Price: 95 EUR

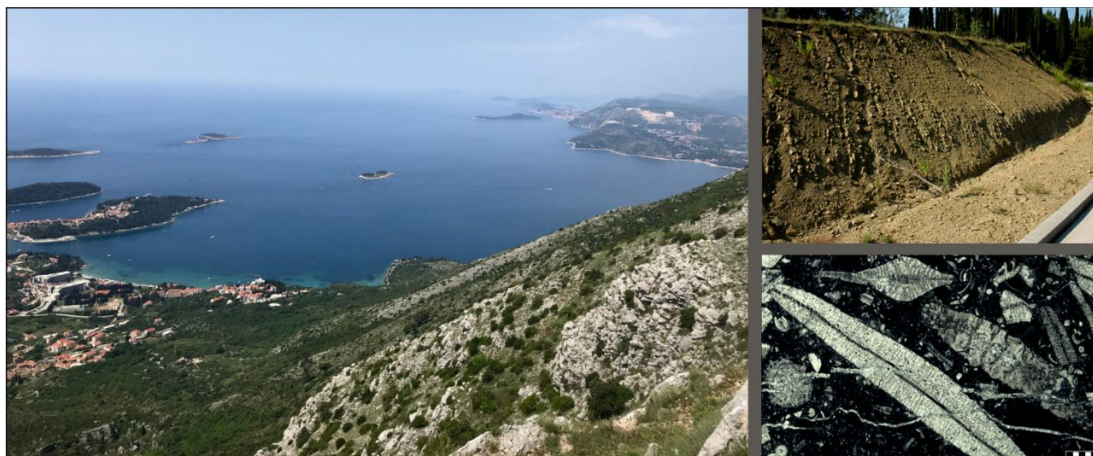
Transportation: bus;

Preliminary number of participants: 30–60

Degree of physical difficulty: short walks, trekking shoes

This field trip focuses on *selected* intervals of the ~5-km-thick Upper Triassic–Miocene predominantly carbonate sedimentary succession of the External Dinarides, spectacularly exposed in the Konavle area near Dubrovnik in southern Croatia. The oldest deposits cropping out in the area are Norian–Rhaetian laminated dolomites (regionally known as *Hauptdolomit* or Main Dolomite) overlain by Hettangian and Pliensbachian shallow-marine limestones, the latter with common lithiotid bivalves. These carbonates formed on a huge semi-isolated carbonate platform of the southern Tethys, which in the late Early Jurassic disintegrated into a set of smaller isolated platforms, separated by oceanic basins. A major part of the External Dinarides is therefore composed of the relatively well-preserved Adriatic Carbonate Platform deposits, predominantly typical shallow-marine carbonates ranging from Toarcian to Maastrichtian, covered by Eocene or in places younger foreland deposits formed due to the collision with the Eurasian Plate.

The trip will emphasize the tectonic, eustatic, and environmental controls that shaped the varied depositional environments, from tidal flats with subaerial exposure breccias and carbonate platform oolite shoals to foreland basins with mixed siliciclastic-carbonate deposits, showing more than 180 MY of a complex geological history in a single day. There will be a focus on Toarcian, *Fleckenkalk*-equivalent oncolitic and oolitic grain-supported limestones, Middle and Upper Jurassic carbonate parasequence/sequence development and disconformities, Upper Cretaceous to Paleogene carbonate deposits, and, in this area younger, Oligocene–Miocene flysch. In addition, we will provide some amazing viewpoints and a touch of local cuisine, as well as offer a glimpse into the contribution of terroir to the flavour of red wines in southern Croatia.



A2

Deep-water Triassic to Cretaceous sedimentary successions of the Budva Zone (Montenegro)

2 days June 11–12, 2023 Croatia, Montenegro Starts and ends: Dubrovnik (CRO)

Trip leaders: D. Kukoč, Š. Goričan, M. Đaković, A. Kocjančič

Contact: dkukoc@hgi-cgs.hr

Price: 330 EUR

Transportation: bus;

Preliminary number of participants: 15–34

Degree of physical difficulty: short walks, trekking shoes

This excursion will examine the complete Middle Triassic to the end of Cretaceous succession of the Budva Basin, exposed in coastal Montenegro (SE of Dubrovnik). This intraplateau basin in the External Dinarides was characterized by deep-marine sedimentation from the Middle Triassic to the Paleogene. The Middle Triassic synrift carbonate and clastic sediments are overlain by a volcano-sedimentary succession. Alternation of pelagic limestones and radiolarites dominates the succession from the Upper Triassic to the Maastrichtian. The dynamics of surrounding carbonate platforms influenced the deep-water sedimentation, with carbonate gravity-flow deposits present throughout the succession.

Besides attractive geological locations, like the exceptionally well exposed Triassic-Jurassic boundary, this field trip presents a chance to visit the world-wide known historic coastal towns of Montenegro.



A3

Oligocene to Pliocene depositional systems in the southern Pannonian Basin and the Dinarides Intramontane Basins

3 days June 10–12, 2023

Croatia, Bosnia and
Herzegovina

Starts: Zagreb (CRO)

Ends: Dubrovnik (CRO)

Trip leaders: O. Mandić, M. Kovačić, N. Andrić Tomašević

Contact: mkovacic@geol.pmf.hr

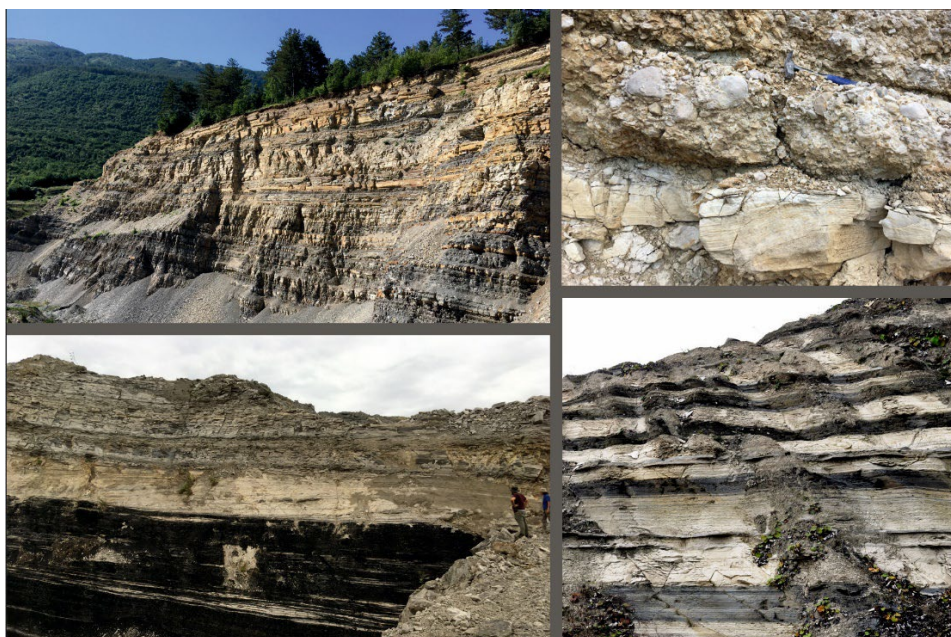
Price: 400 EUR

Transportation: bus;

Preliminary number of participants: 20–40

Degree of physical difficulty: short walks, trekking shoes

The Dinarides fold and thrust belt of Croatia and Bosnia and Herzegovina is positioned between the foreland Adriatic and the backarc Pannonian Basin. Gradual switch from contraction to extension during the Late Oligocene resulted in formation of the first lacustrine intramontane basins along the reactivated thrusts in the internal Dinarides. The extension reached the external Dinarides in the Early Miocene, when the combined effects of tectonic subsidence and the extended humid and warm climate of the Miocene Climate Optimum initiated the formation of the Dinaride Lake System. At the same time, the rifting in the Pannonian Basin and the related tectonic collapse of the internal Dinarides culminated in the Middle Miocene in their marine flooding by the Paratethys Sea. The present excursion will provide an overview on the Late Oligocene to Pliocene sedimentary evolution on different structural units along the transect from the southern Pannonian Basin to the external Dinarides. The first day of the excursion will be dedicated to the southern Pannonian Basin Neogene megasequence in Hrvatsko Zagorje and the Slavonian Mountains region, the second day to the Oligocene-Miocene sediments of the Ugljevik and Zenica-Sarajevo basins, and, finally, the third day to the Miocene-Pliocene successions of the Bugojno and Livno-Tomislavgrad basins.



A4 Quaternary glaciations of the Alps-Dinarides junction

4 days June 9–12, 2023 Slovenia, Croatia, Bosnia and Herzegovina Starts: Gorica (SLO) Ends: Dubrovnik (CRO)

Trip leaders: M. Žebre, P. Jamšek Rupnik, J. Jež, G. Monegato, U. Stepišnik

Contact: uros.stepinsek@gmail.com

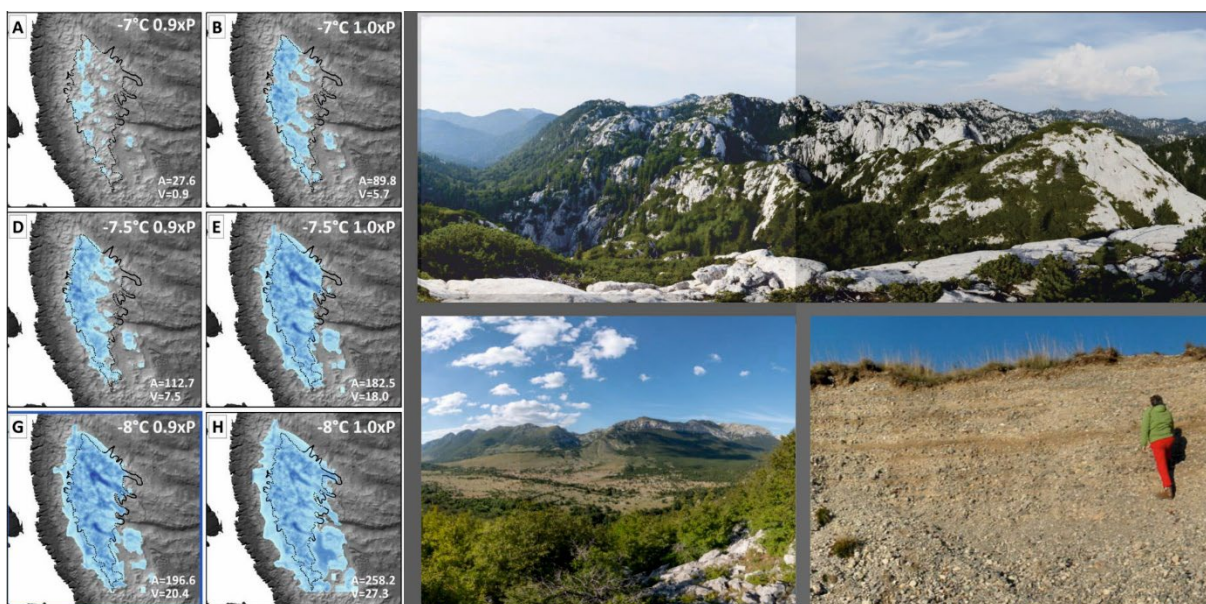
Price: 700 EUR

Transportation: bus;

Preliminary number of participants: max. 30

Degree of physical difficulty: short walks, trekking shoes

Formerly glaciated mountain landscapes are important archives for the study of Quaternary climate change. This landscape type is widespread in the European Alps as well as in the mountains around the Mediterranean, where a lot of new geomorphological and geochronological data has been collected in the last decade. This field trip will provide an overview of the latest findings on glacial chronology, ice extent and past climate, with a focus on the transition area between the Alps and the Dinarides, stretching from Slovenia and Croatia to Bosnia and Herzegovina. The first day will be dedicated to the Soča valley and the Trnovski gozd plateau at the Alps-Dinarides junction, where deformed glacial deposits in a profile at Most na Soči, the sedimentary succession in the Renče clay pit with one of the best preserved LGM palaeovegetation records at the Alps-Dinarides, and the moraine chronology of Smrekova draga will be discussed in detail. The second day will focus on the northern part of the Dinarides (Snežnik and Velebit mountains) and will cover glacial geomorphology and chronology with two main stops in Gomance and Krasno. On the third and fourth day, the glacial chronology of the Čvrsnica, Velež and Crvanj mountains in the central part of the Dinarides will be presented.



A5

**Beaches and cliffs – uncommon coastal forms along the Croatian Adriatic
(Dugi Otok, Split, Brač)**

4 days June 9–12, 2023 Croatia

Starts: Zagreb/Zadar (CRO)

Ends: Dubrovnik (CRO)

Trip leaders: K. Pikelj, M. Martinuš, B. Cvetko Tešović

Contact: kpikelj@geol.pmf.hr

Price: 630 EUR

Transportation: bus + ferry boat;

Preliminary number of participants: 15–30

Degree of physical difficulty: short walks, trekking shoes

The over 6.000 km long Croatian coast is primarily an erosive coast, formed after the Pleistocene-Holocene sea-level rise when previously deeply karstified terrain was submerged. As a result, this coast is mainly rocky and steep, where beaches and cliffs are not common coastal forms. This field trip will focus on coastal segments where gravel beaches and true cliffs were formed. The first segment of the field trip includes the Dugi Otok Island with the famous wide Sakarun beach where gravel, sand, and *Posidonia* banquette participate in unique biogeomorphological processes. In contrast, tectonically predisposed plunging cliffs formed in carbonates in the Telašćica Nature Park will also be visited. The second location is a true cliff developed in flysch within the Split urban zone. This coastal form undergoes rapid erosion, where its slope processes are endangering a part of the urban area. The third location is Brač Island and its unique gravel spit Zlatni Rat. The other carbonate segments of the Brač Island coast will be visited as well, including Pučišća quarry.



Mid-conference field trip

B1 Geology of the old town of Dubrovnik

4 days Any time, self-guided Croatia

Starts and ends: Dubrovnik (CRO)

Trip leader: T. Korbar

Contact: tvrtko.korbar@hgi-cgs.hr

Free of charge

Southern and northern elevated parts of the Old town of Dubrovnik are built on Mesozoic carbonate rocks deposited on the Adriatic Carbonate Platform. The carbonate bedrock is heavily faulted and fractured since strong tectonic deformations of the once buried carbonates began in Eocene with the formation of the External Dinarides, and are still ongoing because of the proximity of regional active faults. The deformed packages of stratified limestones and dolomites resemble lithostratigraphical units established in the wider region of southern Dalmatia, and show sedimentological features typical for peritidal subtropical sedimentation while rare key microfossils allow age determination. The central part of the town is built on anthropogenic deposits filling a narrow late Holocene embayment characterized by superficial Quaternary sediments that cover the heavily fractured and dissected carbonate bedrock. The southern rocky shore is in patches covered by thin (sub)recent supratidal aragonitic encrustations known as pelagosite.



Post-conference field trips



C1	Volcano-sedimentary-evaporitic rocks from aborted Triassic rift and Cretaceous to Paleogene Adriatic carbonate platform successions: OAEs, K – Pg boundary and Pc platform top (central Dalmatian islands, Croatia)		
4 days	June 16–19, 2023	Croatia	Starts: Dubrovnik (CRO) Ends: Split (CRO)
Trip leaders: T. Korbar, M. Belak, L. Fuček, T. Steuber			
Contact: tvrtko.korbar@hgi-cgs.hr			Price: 615 EUR

Transportation: bus + ferry + catamaran; **Preliminary number of participants:** 15–30

Degree of physical difficulty: short walks, trekking shoes

Vis archipelago is located in the central part of the Adriatic Sea and was recognized as UNESCO Global Geopark in 2019. The islands emerged during the Quaternary because of the salt tectonics that characterizes the area. The Adriatic Carbonate Platform (ACP) existed during most of the Mesozoic in the central part of the then more spacious subtropical Adriatic microplate (Adria). The NE part of the platform has been incorporated into the Dinarides fold-and-thrust belt during the Paleogene while the SW part remained relatively undeformed within the Adriatic foreland that is now mostly covered by the sea. Salt diapirs are the most prominent subsurface tectonic structures in the central part of the Adriatic, and are built of once deeply buried volcano-sedimentary-evaporitic rocks deposited during the middle Triassic rifting stage of the Adria. Diapirs uplifted overlying carbonates and in places pierce a few kilometres thick ACP succession (e.g., Komiža Bay, Vis island). Thus, up to 1500 m thick succession of Cretaceous shallow-water carbonates is exposed on the flanks of the Komiža diapir. While pre- and post-Aptian successions are characterised by monotonous peritidal cycles, the Aptian is marked by prominent facies diversification because of the perturbations caused by the Ocean Anoxic Event 1 (OAE 1). The OAE 2 is not completely recorded within the Cenomanian-Turonian succession on the islands of Vis and Biševo, because of a local emergence of the platform during the event, which is followed by a relatively short period of deposition until the Coniacian. In the NE part of the platform, the deposition continued until the Maastrichtian, and in places even into the Paleocene. Thus, the Cretaceous–Paleogene (K-Pg) boundary event is recorded within rare successions deposited on tidal flats (Hvar island) or in inner-platform lagoons (Brač island), but there is still debate on the origin of the specific boundary layer. The Palaeocene platform top is characterized by a major subaerial exposure during which distinct discontinuity surfaces have been formed. The ACP top is unconformably overlain by diachronous Eocene Foraminiferal limestones that are deposited on the distal ramp of migrating Dinaric foreland basin.



C2 Mesozoic-Cenozoic Dinaric foreland basins (Bosnia and Hercegovina, Croatia)			
4 days	June 16–19, 2023	Croatia, Bosnia and Herzegovina	Starts: Dubrovnik (CRO) Ends: Zadar/Zagreb (CRO)
Trip leaders: B. Lužar-Oberiter, K. Gobo, D. Kukoč			
Contact: bluzar@geol.pmf.hr			Price: 650 EUR

Transportation: bus/minivans;

Preliminary number of participants: 15–29

Degree of physical difficulty: short walks, trekking shoes

Synorogenic basins record the long-lasting evolution of the Dinarides mountain chain which developed along the Adria margin through multiple tectonic phases involving large-scale ophiolite obduction and nappe stacking events. From rugged mountain landscapes in the hinterland to the clear blue waters of the Adriatic seaside the field trip will explore basin deposits ranging from the Jurassic to the Paleogene, displaying a variety of sedimentary facies from deep-water pelagics, various types of gravity deposits to shallow-marine and continental environments. Visited outcrops will cover the Late Jurassic-Cretaceous deep-water “Bosnian flysch” which initially formed in response to ophiolite nappe emplacement. The field trip will further follow outcrops recording later phases of flexural foreland basin advancement towards the Adriatic foreland during Cretaceous to Cenozoic orogeny. This involved major composite nappe stacking including thick sequences of Mesozoic and Paleogene carbonates giving rise to the calciclastic Promina beds which record syn-tectonic sedimentation in thrust wedge-top “piggyback” basins.



C3

Mass wasting deposits: From ancient catastrophic submarine collapses to recent alluvial fans; Julian Alps, Soča Valley and Adriatic coast (SW Slovenia, Istria)

4 days

June 16–19, 2023

Croatia, Slovenia

Starts: Dubrovnik (CRO)

Ends: Koper/Ljubljana (SLO)

Trip leaders: L. Gale, D. Gerčar, A. Novak, K. Petrinjak, T. Popit, Ž. Pogačnik, B. Rožić, A. Šmuc, T. Verbovšek

Contact: andrej.smuc@ntf.uni-lj.si

Price: 720 EUR

Transportation: bus;

Preliminary number of participants: 15–30

Degree of physical difficulty: short walks, trekking shoes

Mass movements represent important processes that shape the surface of the Earth. This trip will present an overview of recent and ancient mass movements in a variety of different settings: from recent slope processes to Mesozoic massive submarine platform collapses. Holocene: Tamar and Soča valleys are alpine valleys filled with Holocene rock falls, landslides, debris-flows, mudflows and fluvial deposits. They are forming talus slopes, alluvial and debris-flow fans, each of them with a complex history of sedimentation and erosion. Quaternary: Vipava valley represents a “tectonic” topography with steeply deeping Mesozoic carbonates thrust over gently-sloping Palaeogene flysch. This facilitated the formation of a complex Quaternary sedimentary slope system (debris-flows, scree, mud-flows, rock avalanches, rotational and translational landslide). At the Adriatic coast, ongoing cliff evolution will be observed along with Eocene carbonate megabeds. Mesozoic-Cenozoic: In the middle Soča Valley we will observe three ancient mass movement deposits. Carnian extensional blocky breccia with up to 300m large blocks was deposited in the toe-of-slope. Middle Jurassic basinal blocky limestone breccia that documents the transition to the compressional regime. Paleogene up to 250m thick massive blocky breccias related to thrusting and foreland basin formation.



C4 Quaternary deposits of the island of Mljet			
1 day	June 16, 2023	Croatia	Starts and ends: Dubrovnik (CRO)
Trip leaders: I. Razum, P. Bajo			
Contact: irazum@hpm.hr		Price: 150 EUR	

Transportation: bus + ferry;

Preliminary number of participants:

Degree of physical difficulty: short walks, trekking shoes

Formation of Quaternary sediments of the South Dalmatian Archipelago is tightly connected to the sea level oscillations. In one case sea level rise enabled lake formation in sinkholes and dolinas which were eventually submerged. The best examples of such sedimentary environments are Veliko and Malo jezero, situated in the Mljet national park. In this field trip, evolution and palaeoclimate records derived from the needle-like aragonites, of these submerged Marine lakes, will be shown. Furthermore, the areal distribution of some well-known Holocene eruptions will be discussed since in Veliko jezero are the northernmost findings of Avellino and Mercato eruptions. In the other case, during low sea level, the shelf was emerged which enabled aeolian transport of shelf sediments onto the Islands forming the aeolian sand deposits. In this field trip provenance and time of formation of Aeolian sands will be discussed, again with the emphasis on the tephra occurrence, which enabled high precision dating of the deposits.



Activities for Early Career Scientists

Early Career Scientists (ECS) are IAS members who are students or scientists who received their highest degree within the past seven years, with additional time allowed for those whose work record has been interrupted by child birth, family care, serious health issues, etc.

Different activities will be organised for the ECS to encourage the cooperation and exchange of ideas and experience between the scientist at the beginning of their career.

ECS workshops

ECS workshop: “How to publish a paper in IAS journals”

To be held during lunch break on Tuesday, June 13, 2023.

ECS workshop: “IAS Social Media”

To be held during lunch break on Wednesday, June 14, 2023.

ECS workshop: “How to prepare a CV and a cover letter for job application”

To be held during lunch break on Thursday, June 15, 2023.

Best poster competition

Two best posters categories will be awarded, one for the Student and one for the ECS (post-doc and researchers with less than seven years from their PhD).

ECS corner

A space designated for socializing and discussion among the ECS will be provided. If you are a young scientist, we invite you to present and talk about your research and ideas in a relaxed atmosphere in front of a friendly audience. You can choose a short talk or presentation style as you like, with powerpoint slides, without presentation, with pictures, or video material as best suits you. More information on the ECS corner follows in the subsequent circular and on the Meeting website.

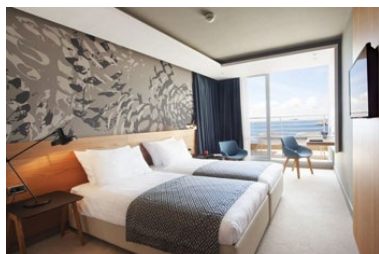
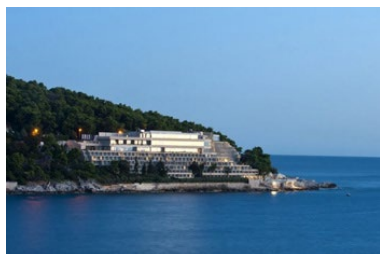
ESC evening event

An evening event will be organized on Tuesday, June 13, 2023, for informal socialising. The details will be given in the third circular and on the Meeting website.

Venue

Hotel Dubrovnik Palace

Masarykov put 20, 20 000 Dubrovnik, Croatia



Breathtaking Adriatic views from every room, a fresh new contemporary interior design scheme and intuitive service are all ingredients for a perfect five-star seaside escape at the multi-award-winning Hotel Dubrovnik Palace.

Hotel Dubrovnik Palace nestles on the scenic seafront between a pine forest and the turquoise coastal waters of the lush Lapad peninsula. Just a few minutes' drive north west of medieval Dubrovnik Old Town, the stunning location offers phenomenal photo opportunities of the Elafiti Islands from every direction.

Magnificent views, relaxing al fresco event spaces, five-star facilities and skilled technical support make Hotel Dubrovnik Palace's conference centre one of the best equipped, and stylish meeting venues in the region. It is also one of the largest and most flexible.

Eleven conference and meeting rooms are designed for standout events for 10 to 750 delegates. Spacious sun terraces overlooking the crystal-clear waters of the Adriatic are ideal for memorable informal gatherings, cocktails and coffee breaks. Similarly, the chic design of the Sunset Lounge is perfect for casual meetings, or for simply relaxing in style after a busy day. It keeps you sated with a range of creative banqueting and fine wine menus.

This contemporary luxury resort has direct access to a quiet and peaceful beach, two outdoor pools and a third indoor pool. Additionally, there is a PADI diving centre, tennis court, a leafy jogging path and walking routes through the picturesque woods that rise up Petka hill behind the hotel.

How to get there

By Air

Croatia's national air company is Croatia Airlines. Via direct flights, it connects Croatia with a great number of European destinations.

Major airports in Croatia are Zagreb (Croatia's biggest international airport), Split, Dubrovnik, Osijek, Zadar, Pula, and Rijeka/Krk.

From the Dubrovnik Airport flights connect the city with Zagreb several times a day, as well as with nearly all European capitals during the summer, directly or via Zagreb. Dubrovnik airport is located 25km from the city port. You can take a bus from the airport to Dubrovnik, which is available after every arrival and drives you to the Bus Station. Taxi services are also available. You may also sign up for a rent-a-car at the airport.

Croatia Airlines:

Tel: +385 1 66 76 555; <https://contact@croatiaairlines.hr>

Dubrovnik Airport:

Address: 20213 Čilipi, Croatia, Tel. +385 20 773 100; <https://www.airport-dubrovnik.hr/en>

Zagreb Airport:

Pleso bb, p.p. 40, 10150 Zagreb

Tel: +385 (0)1 6265 222 or +385 (0)1 4562 222; <https://www.zagreb-airport.hr/en>

By Car

Croatia is well connected with its inland as well as with the rest of Europe. It is recommended to respect the traffic regulations which do not differ significantly from the traffic regulations in other European countries. However, it is important to mention the major ones: driving with the lights on during day and night is compulsory as well as the use of the safety belt. The use of the mobile phone while driving is strongly forbidden except for the handsfree device. The maximum allowed quantity of alcohol is 0,5 ‰ except in cases of an offence. In that case it is treated as a separate criminal offence.

To enter Croatia, a driver's licence, an automobile registration card and vehicle insurance documents are required. An international driving licence is required for the use of rent-a-car services.

The permit is issued by the parent motor-club.

Split can be reached by the Adriatic Coastal Road, winding by the sea or by hinterland roads. From Dubrovnik, it will take you 7 hours to get to Zagreb and 4 hours to get to Split by car.

Speed limits:

Towns and cities – max. 50 km/h

Local roads out of town max. 90 km/h

Motorways max. 130 km/h for motors and cars

Motorways max. 80 km/h for vehicles pulling trailers and for coaches with or without a smaller trailer

24h Breakdown service dial number: 1987

During the whole year petrol stations are open from 7:00 to 20:00. However, during the tourist season they are open 24h a day in all the major cities. Every petrol station offers Eurosuper 95, Super 95, Super 98, Super plus 98, Euro Diesel and Diesel and in better equipped petrol stations consumers can buy liquid gas and Bio Diesel.

Pay-toll is paid according to the number of passed kilometres and according to the vehicle's category. At the toll you can pay cash or by credit card like AMERICAN EXPRESS, DINERS, MASTER CARD, MAESTRO and VISA.

By Bus

Croatia is connected with its neighbouring countries and the majority of central and western Europe through regular international coach lines. Coach stations are to be found in all the major Croatian cities: Zagreb, Osijek, Rijeka, Pula, Split, Šibenik, Zadar and Dubrovnik.

The main **bus station in Dubrovnik is situated in Gruž** and it is 2 km away from the Old town, that is the centre of Dubrovnik. It has been built recently, in the vicinity of the port. In addition to **international lines**, there are intercity bus lines between Dubrovnik and all the major cities in Croatia on a daily basis. **All city parts in Dubrovnik are very well connected by city bus lines.** We recommend you buy a bus ticket in due time, especially during the summer.

By Rail

Croatia has direct connections with Slovenia, Hungary, Italy, Austria, Switzerland, Germany, Bosnia and Herzegovina and Serbia. There are transfer connections with almost all other European countries.

There are trains from Split to the north of the country (the main railway route is Zagreb-Split) and further on to Europe. You can transport your car by train, as well. Split railway station is located near the ferry port, next to the bus station, in the centre of the city.

From Split you can take bus or rent a car to Dubrovnik.

By Ferry & Boat

Jadrolinija is the main Croatian ship passenger carrier that maintains the majority of regular, international and domestic car-ferry, ship and high-speed lines.

You can reach Dubrovnik if you get on a coast ferry liner from Split or from all central Dalmatian islands. There are excellent fast and regular ferry lines from Ancona and Pescara, Italy.

Accommodation

Dubrovnik offers various kinds of accommodation, from camping sites and comfortable rooms in private accommodation to luxurious 5-star hotels. A certain number of rooms have been reserved in the Palace Hotel for conference participants. Please check our website for more information (www.iasdubrovnik2023.org). For those who like travelling by car, Cavtat is another pearl of southern Dalmatia worth visiting.

For support and assistance with accommodation, conference and other travel-related issues and inquiries please feel free to contact our PCO:

Spektar Putovanja, travel agency Ltd.

Mrs. Petra Miškulin Štefek

E-mail: info@iasdubrovnik2023

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